Annual Report of the Ministry of Forests

for the fiscal year ended March 31, 1989

Province of British Columbia
Ministry of Forests
Honourable Claude Richmond, Minister

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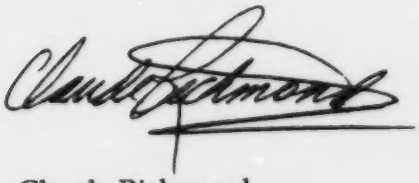
July 17, 1990

Lieutenant-Governor of British Columbia in Council
Parliament Buildings
Victoria, British Columbia

May It Please Your Honour:

Herewith I respectfully submit the Annual Report of the Ministry of Forests for the fiscal year ended March 31, 1989.



Claude Richmond
Minister of Forests

July 16, 1990

The Honourable Claude Richmond
Minister of Forests
Parliament Buildings
Victoria, British Columbia

Sir:

I have the honor to submit the Annual Report of the Ministry of Forests for the fiscal year ended March 31, 1989.

P.G. Halkett

Philip Halkett
Deputy Minister
Ministry of Forests

Contents

Page

I. The Ministry of Forests **1**

Mission 1
Legislative authority 1
Corporate commitment 1
Corporate values 1
Ministry goals 1
Reports 2

II. Program reports **3**

Introduction 3
Management Services 4
Public Information and Library Services 5
Program Administration 7
Harvesting 8
Industry Development and Marketing 9
Silviculture 11
Research 13
Protection 15
Integrated Resource Management 18
Inventory 21
Fire Suppression 23
Forest Resource Development Agreement 24
Forest Stand Management Fund 27
Small Business Forest Enterprise Program 28
Silviculture -- private sector 31
Silviculture activity summary 32

III. Summary financial and statistical tables

Table 1: Revenue in 1988-89, by category, by region 41
Table 2: Expenditure and full-time equivalents in 1988-89, by source of funds 42
Table 3: Expenditures in 1988-89, by category, by region 43
Table 4: Productive forest land in 1988-89 in timber supply areas and tree farm licences, by region 43
Table 5: Deletion of land from provincial forests in 1988-89, by region 44

IV. Detailed Financial Tables

A-1	Minister's Office	45
B-1	Management Services	45
C-1	Program Administration	46
D-1	Harvesting	46
E-1	Silviculture	47
F-1	Research	47
G-1	Protection	48
H-1	Integrated Resources Management	48
I-1	Inventory	49
J-1	Direct Fire Fighting	49
K-1	Fire Suppression Preparedness	50
L-1	Forest Resource Development Agreement	50
M-1	Forest Stand Management Fund	51
N-1	Small Business Forest Enterprise Program	51
O-1	South Moresby Implementation	51
Q-1	Silviculture activity summary	52

V. Detailed statistical tables

D-2 to D-11	Harvesting	53
E-2	Silviculture	64
G-2 to G-6	Protection	65
H-2 to H-6	Integrated Resources Management	68
L-2	Forest Resource Development Agreement	71
M-2	Forest Stand Management Fund	72
N-2 to N-5	Small Business Forest Enterprise Program	72
P-2 to P-3	Silviculture -- private sector	75
Q-2 to Q-10	Silviculture activity summary	79

The ministry's structure

Headquarters organization 87
Region organization 90
District organization 91

I. The Ministry of Forests

Mission

To manage and protect the province's forest, range, and forest recreation resources for the maximum benefit of all British Columbians.

Legislative authority

The *Ministry of Forests Act* [Section 4] states the mandate. It is to:

"(a) encourage maximum productivity of the forest and range resources in the Province;
(b) manage, protect and conserve the forest and range resources of the Crown, having regard to the immediate and long-term economic and social benefits they may confer on the Province;
(c) plan the use of the forest and range resources of the Crown, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated, in consultation and co-operation with other ministries and agencies of the Crown and with the private sector;
(d) encourage a vigorous, efficient and world competitive timber processing industry in the Province; and,
(e) assert the financial interest of the Crown in its forest and range resources in a systematic and equitable manner."

Responsibilities and authorities are defined in:

- *Ministry of Forests Act*, Revised Statutes, 1979, Chapter 272;
- *Forest Act*, Revised Statutes, 1979, Chapter 140;
- *Range Act*, Revised Statutes, 1979, Chapter 355; and,
- *Forest Stand Management Fund Act*, 1986, Chapter 8.

The ministry has administrative responsibility for the *Foresters Act*, Revised Statutes, 1979, Chapter 141. An additional statute that affects the ministry is the *Broom Chain Act*, Revised Statutes, 1979, Chapter 33.

Corporate commitment

- To grow healthy, productive forests to meet the province's social and economic needs;
- To ensure the full use of resource values by British Columbians through integrated resource management;
- To supply forest recreation and manage wilderness values in provincial forests;
- To manage and protect Crown forest lands so as to ensure sustainable development of:
  - Timber for the forest industry; and,
  - Forage for the livestock industry;
- To ensure the province receives appropriate resource revenues from Crown forests and range; and,
- To encourage a vital, efficient, and world-competitive wood-processing industry.

Corporate values

- To maintain a commitment to get results, through effective programs and financial responsibility, and to maximize job opportunities;
- To encourage public and private sector participation in determining and achieving ministry objectives;
- To respond to client needs through efficient, timely and courteous service and decentralized responsibility and accountability; and,
- To develop innovative and entrepreneurial management, through staff development, with emphasis on excellence.

Ministry goals

- To grow healthy, productive forests;
- To make timber available to the forest industry;
- To generate revenues for the Crown from timber harvesting;
- To manage provincial forests for recreational and various other uses;
- To manage forage production for domestic livestock and wildlife;
- To make forage available to the livestock industry;
- To ensure reforestation of Crown forest lands;
- To conduct research in forest renewal, forest productivity and decision aids, and integrated resource management;
- To protect the province's forest and range resources from damage by fire, forest insects and diseases;

- To maintain a current and accurate inventory of forest and range values; and,
- To inform various audiences about the ministry's mandates, goals, organization, policies, programs, products, services and achievements.

Reports

The *Ministry of Forests Act* requires these reports to be prepared:

- A periodic analysis of the conditions, management, and future uses of the forest and range resources to enable the setting of overall priorities and long-term objectives;
- A five-year program updated annually, which sets schedules, methods and priorities for forest and range resource management and improvement; and,
- An annual report on the ministry's programs and activities, including money spent and information on whether the resources entrusted were well-managed and value was received for money spent.

II. Program reports

Introduction

For convenient comparative reading, the program reports follow, as closely as possible, the structure of the government's Estimates for the 1988-89 fiscal year.

The *Estimates* for the ministry include:

- Vote 40: Minister's Office;
- Vote 41: Ministry Operations;
- Vote 42: Fire Suppression Program;
- Vote 43: Forest Resource Development Agreement;
- A statutory special account for Forest Stand Management Fund;
- A statutory special account for the Small Business Forest Enterprise Program; and,
- A statutory special account for South Moresby Implementation.

The program reports focus on six of the above:

- Ministry Operations;
- Fire Suppression Program;
- Forest Resource Development Agreement;
- Forest Stand Management Fund;
- The Small Business Forest Enterprise Program; and,
- South Moresby Implementation Account.

Ministry Operations -- Vote 41

The sub-votes (programs) are:

- Management Services:
  - Senior executive direction and co-ordination of central ministry services, including personnel, finance, audit, information systems, accommodation, communications, and technical and administrative services -- *Management Services* (page 4); and,
  - Public Information and Library Services (page 5);
- Program Administration (page 7):
  - Regional and district administration; and,
  - Grants to agencies involved in forestry research, the British Columbia Debris Control Board, and activities which promote the forest industry.
- Harvesting (page 8);
  - Industry Development and Marketing (page 9).
- Silviculture (page 11);
- Research (page 13);
- Forest Protection (page 15);
- Integrated Resource Management (page 18); and,
- Inventory (page 21).

Fire Suppression Program -- Vote 42

This program (page 23) funds the fighting and extinguishing of forest and range fires and includes related ex gratia payments.

The sub-votes are:

- Direct fire-fighting; and,
- Fire suppression preparedness.

Forest Resource Development Agreement (ERDA) -- Vote 43

This program (page 24) funds provincial spending under the five-year, $300-million, Canada-B.C. Forest Resource Development Agreement.

Special Accounts

- Forest Stand Management Fund (Table M-1):
  - The distribution of grants and contributions from the Forest Stand Management Special Fund established by the *Forest Stand Management Fund Act, 1986;*
- Small Business Forest Enterprise:
  - This program (page 28), funded by a special account (Table N-1), was established by an amendment to the *Forest Act* in 1988; and,
- South Moresby Implementation (Table O-1).

Management Services

Program description and goals

The program's goals are:

- To develop systems, policies and procedures for the effective management of the ministry's human, financial, and physical resources;
- To maintain and enhance the ministry's integrity, reputation, and trusted relationships with central agencies; and,
- To contribute to the improvement and practicality of central agencies' systems and requirements.

The program's various components include:

- Financial services: to provide sound financial policies and systems, which are consistent with the *Financial Administration Act*'s control requirements;
- Information systems: to provide effective and efficient computer information systems for the ministry's operations and access to other government systems;
- Human resources: to provide quality, integrated, staff services through human resource planning, training, development, recruitment and selection, occupational health and safety, and labor relations;
- Technical and administrative services: to provide a comprehensive range of technical and specialized administrative services for the effective management of the ministry's facilities, equipment, and radio communication systems;
- Audit services: to provide audit services to the executive and managers at all levels and to conduct independent, comprehensive and systematic evaluation of the ministry's programs and internal controls; and
- Legal services: to co-ordinate all appeals and compensation claims under the *Forest Act* and *Range Act* and to advise ministry officials on legal matters or interpretation of legal documents.

Client situation

The program's clients are the ministry's executive, managers and employees, the provincial government's central agencies, and the public.

Activities

During 1988-89, work was continued under the program:

- To simplify and improve the productivity and integration of the financial management systems and processes;
- To upgrade employees' skills;
- To increase the effectiveness and efficiency of the management of the ministry's facilities, equipment, and radio communication systems;
- To give district offices direct access to a number of ministry systems so as to improve communications with the rest of the ministry;
- To initiate a major review of the ministry's revenue management policies, procedures, and systems, which will lead to a three-year upgrade program;
- To expand and upgrade current information systems to better meet the ministry's business needs; and,
- To provide expert advice to ministry officials on legal, financial, and technical matters.

Expenditures

Forecast expenditures were $48.0 million. Actual expenditures were $47.4 million. The major expenditure was $25.1 million for technical and administrative services (*Table B-1*).

Public Information and Library Services

Sub-program description and goals

This sub-program, funded under the Management Services Program, co-ordinates the communication of information on the ministry's mandate, goals, organization, policies, programs, products, services, and achievements to:

- Staff (internal);
- The public (external), including:
  - Organized groups and associations;
  - The news media;
  - The forest industry;
  - Forest professionals;
  - Other government agencies;
  - Opinion leaders; and,
  - Universities, colleges and schools.

It also provides:

- An information resource service to staff and the public; and,
- Consultation and advice to staff on communicating information, internally and externally, on the forest and range resources, the ministry's forest and range programs, and forest and range issues.

Client situation

Eight public information sessions, held in late February and early March, 1989, on the ministry's proposed tree farm licence policy, generated a tremendous response from the public and indicated a strong interest in several aspects of the management of the province's forest resources.

More than 300 presentations were made during some 90 hours of information sessions attended by more than 3,000 people.

This public interest in forestry issues led to the establishment of a permanent British Columbia Forest Resources Commission to independently review and make recommendations to the Minister on specific issues.

Activities

Communication plans
Annual communication plans for the ministry and the Canada-British Columbia Forest Resource Development Agreement were developed, co-ordinated, implemented, and evaluated.

Overall communications
A *Communications Project Guidelines* manual was produced and distributed to branch, regional, and district offices.

Video vignettes were produced on computers, second-growth forest management, and rapattack for TV's Knowledge Network.

Print communications
More than three dozen publications on various topics were printed or reprinted and distributed to all ministry offices, for dissemination to the public and to target audiences.

Also published were the *Five-Year Forest and Range Resource Program 1989-1994*, the ministry's annual report, an internal newsletter, public discussion papers, posters, and recreation site maps.

A *Standard Specifications Manual* was produced and distributed to all ministry personnel responsible for internal and external communications to ensure a unified format, graphic look, and a quality standard for all ministry publications, and a consistent identity for the ministry and its programs.

During the year, 155 news releases, 18 news features, and several letters to the editor were issued to the media.

Visual/electronic communications:

- These videos were produced and distributed:
  - 'BT in B.C.' -- uses and safeguards for the use of the pesticide *Bacillus thuringiensis*; and,
  - 'Following Nature's Lead' -- second-growth forest management in B.C.
- A publication display system was developed for use in ministry offices; and,
- A photographic image bank was started.

Media advertising
Newspaper and radio ads were placed to:

- Invite the public to official openings of new ministry facilities and open houses, during National Forest Week, at forest region and district offices in many communities throughout the province; and,
- Increase public awareness of forest fire prevention.

Communications projects under the Canada-B.C. Forest Resource Development Agreement
The ministry worked with the federal government to produce news releases, news features, eight regional brochures, a 1989 calendar, and a quarterly newsletter *Renewal*.

Several materials were produced for use throughout the province during National Forest Week, including a media package, school materials, and tree hats.

'Green Gold Grants' program
The ministry co-ordinated the annual 'Green Gold Grants' forest-awareness program, launched in early 1987 under the Canada-B.C. Forest Resource Development Agreement.

Under the Green Gold Grants program, a total of more than $96,000 in funding was provided to 20 non-profit organizations throughout the province for forestry awareness projects.

Special events/promotions:
- Official openings for two new ministry facilities were organized;
- Open houses were held at ministry offices throughout the province during National Forest Week.

Information resource services
An average of 115 phone calls from the public were handled daily relating to inquiries about ministry programs, products and services, referrals, and requests for publications.

The ministry's library ordered and catalogued 1,967 new books, handled 5,718 reference questions, loaned out 5,196 items, conducted 150 database searches, obtained 1,200 inter-library loans, distributed 2,620 reprints, and implemented an integrated, automated, library system.

Expenditures

Expenditures were $0.879 million contained under the Management Services program (*Table B-1*). This does not include expenditure for projects implemented with other agencies, or ministry programs funded by other sources, such as the Canada-B.C. Forest Resource Development Agreement.

Effects on clients

Inquiries and demand for ministry pamphlets, brochures, maps, reports, and other printed material indicated a keen interest by the public in the ministry's programs.

The sub-program's effectiveness was indicated by:
- The news media's use of ministry news releases; and,
- Verbal and written responses to newspaper and radio ads.

Positive responses to slide shows, video films, special events, and promotions demonstrated that the public viewed the program as necessary, educational, and informative.

Forecasts

Current research indicates that the public will remain keenly interested in the management of the province's forest and range resources, particularly in the government's role in balancing needs for a healthy economy and environment.

Research indicates that the public will require more information for informed opinions on the management of the forest resources.

Program Administration

Program description and goals

The program's goals are:

- To provide support services for all resource programs at the region and district levels in the area of finance, personnel, systems, and technical services; and,
- To provide grants to agencies involved in forestry research and the promotion of forest management.

Client situation

The program's clients are the forest and ranching industries, the public, ministry staff, agencies involved in forestry research, and agencies involved in the promotion of forest management.

Activities

During 1988-89, the activities included:

- The operations of six forest regional offices in Vancouver, Prince George, Smithers, Williams Lake, Kamloops and Nelson, which provided:
  - The development of regional programs and procedures from broad provincial policies;
  - Corporate direction, and professional and technical expertise to assist forest districts in implementing ministry programs; and,
  - The auditing and monitoring of the performance of districts;
- The operations of 43 forest district offices and 14 field offices, which were involved in:
  - The delivery of the ministry's programs; and,
  - Revenue collection and reporting;
- Extending grants to:
  - B.C. Forestry Association;
  - Association of B.C. Professional Foresters – Westland Television Program;
  - B.C. Debris Control Board;
  - Junior Forest Warden Program; and,
  - Pacific National Exhibition Annual Forest Show.

Expenditures

Forecast expenditures were $38.4 million. Actual expenditures were $36.6 million. The major expenditure was $12.1 million for management (*Table C-1*).

Effects on clients

This program enhances and promotes the efficient delivery of the other resource programs and ensures that statutory requirements are met (example: *Financial Administration Act*, *Worker's Compensation Act*).

The program also provided grants to various forestry agencies.

Forecasts

Levels of expenditure will increase due to inflation and new system initiatives.

Harvesting

Program description and goals

The program's primary goal is to make timber available to the forest industry, consistent with approved rates of harvest, and in a way that fulfils the ministry's mandate.

This involves a number of activities, including:

- Operational timber-harvest planning and harvest-plan approval;
- Issuance of licences and cutting authority;
- Forest road and bridge engineering and development;
- Monitoring harvesting operations; and,
- Timber valuation, scaling, and billing.

Client situation

During 1988-89:

- Approximately 59.8 million cubic metres of Crown timber were harvested under forest tenures in which the harvest rate is regulated annually. This compares with a total allowable annual cut of approximately 61.6 million cubic metres for these tenures;
- An additional 15.8 million cubic metres of Crown timber were harvested under forest tenures in which the volume harvested is regulated on the basis of area or time. This includes forest tenures such as timber licences outside of tree farm licences, most timber sale licences, woodlot licences, and licences-to-cut. This resulted in a total harvest on Crown lands of 75.6 million cubic metres.
- A further 9.6 million cubic metres of timber were harvested from private land, federal lands, and Indian reserves, making a total provincial harvest of 85.2 million cubic metres (*Table D-3*).
- More than 840 kilometres of new forest roads were constructed, bringing the total to more than 32 500 kilometres (*Table D-9*);
- Nearly 5 000 kilometres of these roads were improved, upgraded, and maintained (*Table D-10*);
- Bridges and major culverts -- an integral part of the forest roads network -- increased by nearly 200 to a total of 3,033 (*Table D-11*); and,
- Logs exported (*Table D-6*) decreased by 35 per cent to 2.5 million cubic metres, reversing last year's trend.

Activities

The program made timber available to the forest industry by assisting in operational timber-harvest planning and approving timber harvest plans.

Licences and cutting authority were issued and administered. Table D-7 gives the number of licences administered. Table D-8 indicates volumes committed by form of commitment.

The program assisted in road and bridge engineering and development. It monitored harvesting operations and carried out timber valuation, scaling, and billing.

Forest revenues

Revenues, including stumpage collected from over 1,000 licensees, amounted to $623.6 million (*Table 1*).

Stumpage charges were the main revenue source.

Stumpage charges for non-competitive licences averaged $6.68 per cubic metre, up 13 per cent from the previous year (*Table D-2*).

Total stumpage billed for competitive licences increased by more than 94 per cent (*Table N-2*).

Expenditures

Forecast expenditures were $42.9 million. Actual expenditures were $42.9 million. The major expenditure was $15.8 million for engineering and roads (*Table D-1*).

Effects on clients

Additional timber volumes were made available under the competitive timber program, creating new opportunities for small business forest enterprises. (See program report on Small Business Forest Enterprise.)

Two new pulpwood agreements were issued in early 1989, providing a supply of pulp timber to support an increase in pulp-production capacity in the province.

Forecasts

Harvest levels, on a provincial basis, will depend on a number of factors, the most significant being market conditions.

Industry Development and Marketing

Sub-program description and goals

This sub-program, funded under the Harvesting program, analyzes opportunities for maintaining and expanding the forest products industry.

Its goals are:

- To develop policies to promote and enhance the industry's position in manufacturing, product development, and domestic and international trade;
- To provide information and liaison services for potential investors;
- To propose legislation and related programs to encourage a vigorous, efficient, and world-competitive forest industry; and,
- To provide funding for forest products research.

Client situation

The industry turned in a strong performance:

- Total shipments were up by about 4.4 per cent to $12.4 billion;
- After-tax profits of the large, publicly traded companies based in the province were more than $880 million, up from $820 million, for a 7.3-per-cent increase;
- Intended capital and repair expenditures totalled $3.1 billion, exceeding the 1988 record year by about 25.4 per cent.

Lumber

Lumber production decreased by about two per cent to 15.6 billion board feet. Prices for spruce-pine-fir 2x4s averaged about US $186 per 1,000 board feet (MBF), with a range from roughly US$175 per MBF to US$202 per MBF.

The North American lumber market was generally weaker in 1988 because U.S. housing starts declined from 1.63 to 1.49 million units.

Lumber prices in North America fell by more than five per cent. However, lumber shipments to offshore markets, such as the European Economic Community, Japan, and Australia increased, partially offsetting the weaker North American markets.

Pulp

Market pulp shipments were down by two per cent to 4.1 million tonnes. Prices for northern, bleached, softwood, kraft pulp continued the previous year's steady increase, rising by about 22 per cent to US$800 per tonne in early 1989.

Newsprint

Newsprint production increased by 3.5 per cent to a record production of 1.6 million tonnes.

Producers announced price increases in 1988 but were unable to implement them due to a lower consumption level in the U.S. and anticipated new capacity during 1989. By year-end 1988, newsprint prices were down by about three per cent to US$580 per metric tonne, from US$589 a year earlier.

Plywood

More than 80 per cent of the plywood produced is used domestically. The Canadian housing market in 1988 was weaker with 221,000 starts -- 10 per cent lower than in 1987. Plywood production decreased by 3.6 per cent to 1.8 million cubic metres (2.1 billion square feet, 3/8 inch basis).

Shakes and shingles

Exports of shakes and shingles, 98 per cent of which goes to the U.S., decreased by 16.3 per cent due to, among other things, the import tariff imposed by the U.S. in June 1986.

The 35-per-cent duty, scheduled to be phased out over five years, is intended to provide import relief to U.S. producers and give them time to adjust to the competition from the province. The duty was reduced to 20 per cent at the start of 1989. Further reductions are scheduled for subsequent years.

The forest industry accounted for close to 50 per cent of the value of shipments from all manufacturing industries in the province. Approximately 75 per cent of the forest products were exported.

Nationally, the province accounted for more than 40 per cent of the $22.5 billion of exports in the forestry sector.

The industry has opportunities to:

- Diversify export destinations;
- Expand specialty, secondary, and tertiary milling of solid-wood products;

- Use updated forest inventory data to determine potential developments for pulp and paper products; and,
- Use previously non-commercial tree species, such as aspen and alder.

Activities

The program's activities included:

- Meetings with investors to explore opportunities in the forest products industry;
- Economic analysis of proposals for new forest licences and pulpwood agreements;
- A fibre-supply study and other reports on the present state and potential development of the forest resource and the forest products industry;
- Analyses of trade issues affecting the forest products industry; and,
- Funding support for wood-products research.

Expenditures

Forecast expenditures were $8 million. Actual expenditures were $7.5 million (*Table D-1*). The major expenditure was $6.7 million to support wood products research.

Effects on clients

The industry is actively expanding, introducing new manufacturing processes, and using fibre, such as aspen and alder, previously considered non-commercial.

Forecasts

The industry is expected to become more diversified and world-competitive, with expanded trade in world markets.

Silviculture

Program description and goals

The overall silviculture program (see 'Silviculture activity summary' -- page 32) involves restocking denuded forest lands and improving the value and productivity of forest stands through these treatments:

- Restocking -- artificially (by planting and seeding) and naturally (by seeding) -- harvested areas and lands denuded by wildfires, pests and other damages (referred to as 'denuded lands');
- Preparing sites to promote natural restocking and to help in planting;
- Brushing some stands to ensure unimpeded seedling growth;
- Spacing of trees, freeing older conifers from competition, and fertilizing selected forest stands to improve their value and productivity; and,
- Surveying to monitor growth and survival on an operational basis.

This section deals only with the Silviculture program under Ministry Operations (Vote 41), which funds a portion of the program: the restocking of areas denuded after January 1, 1982, and before the beginning of the private sector program (page 31) and the Small Business Forest Enterprise Program (page 28) on October 1, 1987.

The program under Ministry Operations (Vote 41) has three components: Silviculture operations; Nursery operations; and, Seed operations. Each component's goals are given in each activity section.

Client situation

The general client group, the forest industry, and its specific clients -- silviculture contractors -- were used to the fullest extent in field activities.

Eight of the nine ministry nurseries offered for privatization were sold. This increased the scope of silviculture contractors.

Almost all field operations for the ministry were contracted to the private sector.

Activities

Basic silviculture

This component involves restocking areas harvested under the Small Business Forest Enterprise Program and by licensees between January 1, 1982, and October 1, 1987.

Activities included surveying, preparing sites, planting, and brushing.

Accomplishments on Crown lands, relative to goals, were:

Activity	Goals[1]	Accomplishments
	---------- hectares ----------	
Surveying	345 239	354 292
Preparing sites	89 260	70 771
Planting	129 276	119 029
Brushing	26 331	19 127
Spacing[2]	-	641
Other[3]	-	3 820
	------ number of seedlings ------	
Seedlings planted	154,523	145,170

1. Regional revised targets from published goals.
2. Includes spacing of young conifers and falling of diseased and damaged trees.
3. Includes pruning, controlling mistletoe, and falling snags and residual trees.

Under Ministry Operations (Vote 41) for silviculture, ministry and licensees were responsible for:

- Surveying: 354 000 hectares;
- Preparing sites (32 per cent in the Prince George forest region): 71 000 hectares;
- Planting about 145 million trees on Crown land denuded between January 1, 1982, and October 1, 1987: 119 000 hectares; and
- Brushing: 19 000 hectares.

Table E-2 gives these accomplishments by forest region, funded by Ministry Operations (Vote 41), and Table Q-8 shows average costs of basic silviculture treatments.

Nursery operations

More seedlings are now grown in private sector nurseries than in ministry ones.

The ministry's 11 nurseries were limited to produce 100 million seedlings. The remaining seedlings that are required annually are grown, under contract, by the private sector.

Eight of the nine ministry nurseries offered for privatization were sold. They were in

Campbell River, Chilliwack, Harrop, Koksilah, Red Rock, Telkwa, Thornhill and Vernon.

During 1988-89:

- 240 million seedlings were sown in ministry and private nurseries, with most scheduled for planting in 1989-90;
- About 90 per cent (or 216 million) of the seedlings were sown in containers, the rest as bareroot stock; and,
- The most requested were one-year-old, container-grown, spruce and pine.

Ministry nurseries

Container operations were expanded and greenhouses were upgraded to produce more two-year-old, larger, more-mature, container seedlings because they are needed to compete successfully with brush on productive sites.

Ministry nurseries sowed for 95 million seedlings before privatization – about 40 million were two-year-old container seedlings.

The eight privatized nurseries sowed 63 million seedlings -- 31 million were one-year-old containers, 18 million were two-year-old containers, and 14 million were bare-root seedlings.

Private nurseries

Commercial and forest company nurseries (before privatization) sowed for about 145 million seedlings -- seven million were bareroot.

Forest company nurseries sowed for 36 million seedlings.

Seed operations

This activity provides seed for all nurseries.

Seeds are collected from natural stands and seed orchards. They are also occasionally bought from out-of-province suppliers for operational and research use.

During 1988-89, there was:

- A medium crop in natural stands;
- A medium-to-heavy crop in seed orchards;
- 7 585 kilograms of seed added to the provincial seed inventory;
- 3 764 kilograms of seed withdrawn, leaving an expected inventory of 45 503 kilograms of all native species after the 1989 spring sowing (species breakdown in *Table Q-9*); and,
- 44 orchards, covering 116 hectares, managed under co-operative orchard programs -- 22 ministry orchards on 69 hectares and 22 industry orchards on 47 hectares.

Forest Act amendments, requiring major licensees to pay the seed cost for areas harvested after October 1, 1987, are having a major impact on the co-operative orchard program.

In February 1988, the ministry served notice that effective April 1, 1990, the seed orchard agreements, which granted funds to industry-managed orchards via credits against stumpage accounts, would be cancelled. In the remaining year, funding support will continue under direct contracts with the ministry.

Tree improvement councils are looking at alternate funding and the ministry plans to renegotiate new seed-orchard agreements in line with the new policy.

Expenditures

Forecast expenditures under Ministry Operations (Vote 41) were $145.5 million. Actual expenditures were $134.1 million.

Effects on clients

With privatization of eight ministry nurseries in 1988-89, the involvement of silviculture contractors increased substantially.

The Ministry Operations (Vote 41) for silviculture generated 507,000 person-days of employment.

Forecasts

Recent policy changes have shifted financial responsibility for substantial parts of the program to the private sector.

Overall silviculture investment will expand, with the private sector providing an increasing share.

Government expenditures through the Ministry Operations (Vote 41) will drop significantly after the ministry has completed its obligations on past harvests.

Research

Program description and goals

The program addresses complex forest resource management issues by providing research support to achieve the ministry's operational goals and transferring research findings into operational practice. The goals are:

- Forest renewal research: to meet the challenge of forest renewal through research in seed and stock improvement, regeneration, and forest establishment.
- Forest productivity and decision aids research: to provide growth and yield information to assess the effect of stand-tending treatments of managed stands in B.C., and to develop decision-aid tools to assist forest managers in making the best strategic and operational decisions.
- Integrated resource management research: to address key forest and range resource problems, taking into consideration the impact of forestry practices on wildlife and fish habitats, climate, soils, hydrology, recreation, and the visual landscape.

Client situation

Programs are directed by client advisory committees, including the B.C. Forest Research Advisory Committee, regional research advisory committees, coast and interior tree-improvement and forest-productivity committees, and nursery technical committees.

Many co-operative projects are underway with the forest industry and other agencies and institutions throughout the province, including the University of B.C., Simon Fraser University, the University of Victoria, Forestry Canada, Agriculture Canada, Fisheries and Oceans Canada, the Ministry of Environment, Forest Engineering Research Institute of Canada, FORINTEK Canada Corporation, the U.S. Forest Service, and special interest groups.

Activities

The program has three sections:

- Forest renewal;
- Forest productivity and decision aids; and,
- Integrated resource management.

It is complemented by two support sections: finance and administration, and, technical support services.

Forest renewal research

The program continued projects to increase the performance and genetic quality of tree seed, and the survival and growth of replanted trees to the free-growing stage. Their aims are to achieve forest renewal objectives and to assure future wood supply.

These were the activities:

- Prepared an operations manual for container seed orchards and produced the first seeds from pilot, scale-operational, container orchards of interior spruce;
- Tree improvement programs:
  - Produced 30 million genetically improved, interior spruce seeds for operational use;
  - Developed methods for large-scale production of rooted cuttings of genetically superior, interior spruce;
  - Completed grafting for the first seed orchard of western larch;
  - Completed interim guidelines for seed transfer of Sitka spruce; and,
  - Identified and propagated weevil-tolerant populations of Sitka spruce for further testing;
- Developed tree-pruning treatments and applied them at industry and ministry seed orchards; and,
- Successfully applied stem injection of plant-growth regulators to enhance seed production in interior spruce-seed orchards.

Forest productivity and decision aids

- Evaluated silvicultural treatment options in terms of financial return by using a comprehensive computer program capable of simulating the growth of stands, sawing logs, and assessing the end-product's value;
- Adopted new, site-index curves for nine-year responses of Douglas-fir, hemlock, cedar, amabilis fir and alder for use in coastal forests; published the new curves as a Canada-B.C. Forest Resource Development Agreement report;
- Continued re-measurement, analysis, and reporting of backlog data from older growth-and-yield installations; and,
- Made progress in establishing new, long-term, high-quality growth-and-yield research installations to address obvious data deficiencies in the area of establishment density, spacing of young conifers, and fertilization in lodgepole pine and white spruce;

Integrated resource management research

- Continued the ecosystem classification, and devised further management interpretations for harvesting and silviculture to reduce site degradation and to maintain or enhance forest and range productivity throughout the province;
- Produced several maps and field guides based on the ecosystem classification;
- Continued wildlife habitat research to investigate ways that the management of timber, deer, elk, and grizzly bears can be integrated in provincial forests, and completed many reports and presentations for technical and public audiences;
- Reported fish-forestry interaction research in several *Land Management Reports*, implemented new, coastal, fish-forestry harvesting guidelines, and initiated new research as part of the Fish-Forestry Interaction Program Phase II to reduce the impact of forest harvesting on fish streams;
- Transferred tools and training packages for integrated resource use to managers, including the first approximation of a workbook to facilitate the assessment of hydrological sensitivity and thereby to prevent serious changes to the hydrological regimes of watersheds due to timber harvesting; and,
- Carried out research on the effects of knapweed density on grass productions; prepared reports on seven years of research into rates, types, and dates of fertilizer applications on grass yields; and continued a study on the impacts of grass and cattle on tree establishment and growth;

Technical support group

The communication and extension services section became part of the technical support group in May 1988. The group:

- Provided research information in the form of more than 70 different publications;
- Upgraded research station buildings and facilities; and,
- Conducted statistical and systems training to increase researchers' knowledge and use of computer-based statistical applications for data analysis.

Expenditures

Forecast expenditures were $9.5 million. Actual expenditures were $9.5 million. The major expenditure was $2.8 million for regional sciences (*Table F-1*).

Effects on clients

Forest renewal research

Client problems were addressed through the production of 30 million genetically improved spruce seeds and the successful treatment, and consequent genetic improvement, of the seeds of other commercially valuable species.

Forest productivity and decision aids research

The production of managed, stand-yield tables and site-index curves enabled clients to make informed management decisions and to improve stand-tending treatments.

Integrated resource management research

Clients derived benefits through informed management decisions made possible through expanded ecosystem classification.

Similarly, clients benefited from the development of recommended procedures to integrate wildlife and forestry management.

An export system tool was developed to assess the sensitivity of watersheds to harvesting.

Forecasts

The demand for research solutions, especially those addressing high-impact forest management issues, has increased over the past five years. This trend is expected to continue.

Ensuring a future wood supply will continue to be the driving force behind forest renewal research.

Forest productivity and decision aid research, created to address operational efficiency issues, will continue to generate tools to aid management decisions.

Multiple-use issues and questions will continue to receive major attention. Wildlife habitat, wilderness preservation and access for non-forestry use will be some of the areas addressed by integrated resource management research.

The research program will continue the trend toward contracting research and cooperating with other government agencies and universities. It will also continue its emphasis on addressing client-oriented, high-impact problems and to deliver workable solutions.

Protection

Program description and goals

The program's purpose is:

- To protect the forest and range resources from damage by fire, forest insects, and diseases;
- To protect life, property, and other natural resource values from fire; and,
- To support silviculture site treatments, and range and wildlife habitat creation and maintenance, by using prescribed fires.

The ministry and its contractors have fire control responsibilities during the fire-detection and initial-attack phases. The forest industry is responsible for initial attack on a small percentage of provincial fires.

The forest industry and, to a lesser extent, the construction industry, supply men, material, and heavy equipment during the extended fire-fighting phase.

Senior forest industry staff are used in the fire control organization, depending on their training and skills.

The ministry provides management personnel, operational staff, and most initial-attack resources to achieve fire-management goals.

The forest, ranching, and wildlife industries co-operate with the ministry and the Ministry of Environment to achieve prescribed burning goals.

The fire management goal is to limit the annual area burned to 69 000 hectares and timber losses to 2.6 million cubic metres.

This goal was achieved: 11 482 hectares were burned and about 546 000 cubic metres were lost.

The pest management goal is to reduce timber losses due to insects and diseases.

During 1988-89, defoliators and bark beetles attacked 688 526 hectares. An estimated 5.62 million cubic metres were lost. An estimated 3.01 million cubic metres were lost due to root rot and mistletoe.

Client situation

British Columbians are served through forest-fire control and pest management services. The forest industry, national parks, other ministry programs, and other provincial and federal government programs deliver these services to the public.

Activities

Fire management

All activities relating to fire-fighting preparedness, forest-fire prevention, and organizational support for forest-fire suppression are included.

The ministry:

- Maintained its forest-fire detection systems and extended its lightning location system by sharing its direction finder sites with other agencies and by upgrading equipment;
- Encouraged, through media ads and the Zenith 5555 toll-free phone number, public assistance in detecting and reporting wildfires; public support remained high;
- Continued fire prevention programs including:
  - School programs;
  - The reward system for arson fire information; and,
  - 'Smokey Bear's' numerous appearances across the province;
- Introduced the successful 'Beware and Prepare' video to address the wildland/urban interface program, in cooperation with local fire departments throughout the province;
- Researched, updated, and improved fire-fighting equipment;
- Continued the fire-suppression training program;
- Improved its initial attack capabilities by increasing the use of the crews' mobility;
- Continued the successful use of specialty teams, such as the 'overhead' and 'fire information support' teams; three prototype 'unit crews' were formed to assist in fighting large fires, by building fireguards in difficult situations; the 'unit crew' concept was a success and an expansion is planned.
- Used prescribed fire, in support of other programs' goals, to treat 163 058 hectares as follows:

	Hectares	Per cent
Hazard abatement	1 484	1
Silviculture treatment	88 756	54
Wildlife habitat improvement	64 880	40
Range improvement	7 938	5
Other	-	-
TOTALS	163 058	100

Pest management

This includes all activities associated with forest diseases, insects and vertebrate pests.

The ministry:

- Conducted aerial and ground surveys to detect and quantify major pest infestations; these included:
  - A province-wide survey for gypsy moth, conducted in cooperation with Agriculture Canada and Forestry Canada, during which 1,800 traps were placed; and,
  - A survey of young stands to assess levels of damaging insects, such as terminal weevils and root diseases;
- Identified and assessed major insect infestations, including:
  - The western spruce budworm outbreak, which covered 360 000 hectares and continues in the Kamloops forest region -- about 550 hectares were treated with the biological insecticide *Bacillus thuringiensis*; and
  - The blackheaded budworm outbreaks, which covered 64 000 hectares in the Vancouver forest region;
- Appraised damage, including:
  - The remeasurement of permanent sample plots in representative damaged and undamaged stands to determine actual losses caused by the western spruce and blackheaded budworms; and,
  - Projects to:
    - Develop the growth-and-yield model prognosis -- a model capable of many pest interactions; and,
    - Incorporate pest effects with the current timber supply area planning process;
- Continued the emergency bark beetle program:
  - Mountain pine beetle infestations were contained throughout the province but the potential for increase remains high; and,
  - Expenditures of $5.9 million supported surveys, suppression, and containment programs;
- Conducted two major program reviews:
  - A comprehensive audit of the five-year emergency bark beetle program; and,
  - Review of the B.C. bark beetle program;
- Conducted the first operational trials against the eastern spruce budworm;
- Continued operational control programs to eradicate dwarf mistletoe, following harvest in interior lodgepole pine stands -- over 80 000 hectares were identified in the 100 Mile House forest district as requiring assessment and/or treatment;
- Conducted pest management projects, funded by the province under the Canada-B.C. Forest Resource Development Agreement, including:
  - Control trials and surveys to prevent or reduce damage from porcupines in young spaced stands;
  - Control trials and root diseases surveys, including rhizina root disease of seedlings, tomentosus root rot of spruce, armillaria root disease, and laminated root rot of Douglas-fir;
  - Re-measurements of plots established to assess control of root rot disease, dwarf mistletoe, leader weevil of spruce, and white pine blister rust;
  - Establishment of demonstration areas for white pine trees showing resistance to blister rust;
  - Surveys of injuries and growth of forest trees near a sulphite-process pulp mill; and,
  - Publication of a field brochure describing assessment of laminated root rot on coastal sites being reforested with conifers;
- The ministry representative on the B.C. Pesticide Control Committee reviewed 596 forestry-related, pesticide-use applications and made recommendations to the Ministry of Environment: 320 of these applications were from the ministry and 276 were from the forest industry; and,
- The pesticide policy was revised and reissued.

Air Operations

Total ministry expenditure for aircraft and aviation support for all ministry programs was $24.8 million:

- $4.2 million on forest-protection flying, fertilizing, seeding, spraying, pest management, and other forestry field activities; and,
- $20.6 million on fire suppression activities:
  - $18.7 million for fire-suppression flying, air tanker flying, helicopters, aerial detection and transport; and,
  - $1.9 million for air tanker base operations and development.

Air tankers acted on 323 targets (16.6 per cent of total fires), providing initial action or support to ground forces on fires.

Air tankers were released to assist the

Northwest Territories and the U.S.; helicopters were released to assist the Northwest Territories and Ontario.

A firecat air tanker, with an on-board, foam-injection system, was operationally tested in the Kamloops and Cariboo forest regions.

Capital works projects undertaken were:

- Relocation of the Abbotsford air tanker base: construction of new loading ramps, retardant storage/workshop facilities and retardant evaporation pit;
- A new, air-operation centre at Castlegar; and,
- A new, retardant-storage and workshop facility at Cranbrook and major improvements at Terrace.

Planning, development, and research

Technical and related support were provided in fire-management information systems, prescribed fire use in forest management, pest management in forest planning, weather data collection, provincial lightning-location system and provision of user support for all protection systems. The ministry:

- Expanded the advanced, fire-management-system prototype to all regions and 12 districts -- it also involved the conversion to an intelligent workstation for future developments;
- Developed and implemented a model to project the spread of the mountain pine beetle within the province;
- Initiated two, expert-system-based projects to assist in prescribed fire decision-making:
  - One involves the UBC Faculty of Business and Commerce and is directed at predicting fire effects; and,
  - The other, being developed by Forestry Canada's Petawawa National Forest Institute, will expand the capabilities now available through the predictor/planner sliderule system;
- Upgraded the lightning location system through the conversion of five direction-finder antennae sites to the advanced, lightning-direction-finder technology to increase detection efficiency -- conversion of the central processing unit to an advanced position analyser was required to allow the use of a shared network to reduce operation costs; software was developed to allow detailed display of the lightning data on the advanced, fire-management-system's workstations;
- Proceeded with implementing the fire weather network as per the five-year plan, with 18 stations on-line reporting on an hourly basis;
- Began development of a fuel management/burning permit management system prototype;
- Tested the development of an automated, situation-report prototype in the Nelson region -- feedback will be used to develop the final system for implementation in the 1989 and 1990 fire seasons; and,
- Began drafting new, smoke management policy and designing tools to manage the impacts from prescribed fire smoke.

Expenditures

Forecast expenditures were $19 million. Actual expenditures were $19 million. The major expenditure was $5.8 million for the emergency bark beetle control program (*Table G-1*).

Effects on clients

By achieving its goals, the program had a positive impact on its clients. No adjustments to projected harvesting plans were required.

Forecasts

The prescribed burning program is expected to level out during 1989-90. Increased emphasis on smoke control will be required.

The western spruce budworm outbreak near Kamloops will remain about the same size as 1988. Otherwise, defoliators are not expected to be a major problem.

The mountain pine beetle has great potential to expand and can only be contained with an aggressive suppression program. Douglas-fir and spruce beetles will expand slightly.

A new, air tanker base will be developed in Fort St. John to improve air tanker effectiveness in the north east.

A new, air tanker availability contract will be negotiated to provide a long-term, stable, air tanker fleet.

New contracts will be tendered to provide guaranteed availability of scarce, specialized, aviation resources and lower flying charges for other ministry programs.

Integrated Resource Management

Program description and goals

The program manages range and recreation resources, integrates their management with timber production and other provincial resources, and co-ordinates the forest planning process.

Under this program, the ministry:

- Prepares integrated resource plans;
- Maintains a dialogue with resource agencies, the forest and ranching industries, and the public on objectives and management priorities;
- Ensures sound stewardship of forested and non-forested Crown rangelands;
- Administers range tenures for forage-use by livestock, and gets a fair price for Crown forage;
- Protects provincial forests' recreational values, including landscape aesthetics and wilderness; and,
- Provides recreation sites and trails in provincial forests for public use.

Client situation

The program services diverse clients by setting standards of resource stewardship and by producing management plans.

The resource and tourism industries, other resource agencies, and the public are the major clients.

The program gives beef cattle producers, guides/outfitters, and other tenure holders access to rangeland forage -- almost one million months of grazing for livestock. Numerous wildlife species use additional forage.

There were 1.9 million user visits to the ministry's recreational sites and trails in provincial forests, and another 15 million user-visits were dispersed over the provincial forest lands.

Activities

There are three sub-programs -- resource planning, range management, and recreation management -- each with their own mandate. These sub-programs complement each other to achieve a holistic approach to resource management.

Resource planning

This sub-program achieves integrated resource management by:

- Preparing strategic and local resource-use plans;
- Co-ordinating inter-agency dialogue;
- Consulting the public on forest resource planning;
- Addressing environmental protection issues; and,
- Recommending timber harvesting rates.

Plans are prepared or approved for:

- 35 timber supply areas;
- 32 tree farm licences; and,
- More than 200 local resource-use plans.

In 1988-89, the allowable annual cut was 55.7 million cubic metres from timber supply areas and 18.8 million cubic metres from tree farm licences.

The actual annual harvest deviates from the allowable annual cut due to market demand, but is required to meet cut control limits over a five-year cut-control period.

Range management

This sub-program emphasizes the protection and conservation of rangelands ecosystems, while providing for their use by livestock, wildlife, and other resource objectives.

Cost-effective management initiatives were used to enhance forage production and improve its quality.

The ministry:

- Administered 1,706 permits, 411 licences for grazing, and 58 permits and 101 licences for hay-cutting. The grazing permits and licences for livestock authorized 978,580 animal-unit-months, 9,124 less than in 1987-88;
- Kept the range ground-rent at 20 cents per animal-unit-month, the same as in 1987-88, but increased the grazing fee (relative to the previous year's cattle prices) from $1.27 to $1.55 per animal-unit-month, in accordance with the fee formula which reflects the selling price of cattle;
- Seeded 9 885 hectares of disturbed forest and 379 hectares of grassland for grazing and to control erosion;
- Carried out weed control -- principally for knapweed and thistles -- on 711 hectares;
- Continued research on the biological control of knapweed and other weeds;

- Continued a range inventory project in the Nelson forest region;
- Drafted policies on award of new tenures, commensurability, non-use, and tenure administration for review;
- Initiated a range program review; and,
- Evaluated procedures for environmental monitoring in range and wildlife habitat management.

Table H-4 details range improvements on Crown Lands; those financed without provincial assistance are not included.

Recreation management

This sub-program:

- Provides the public with opportunities for recreation experiences in provincial forests;
- Protects and manages the use of recreational values, including the forest landscape, wilderness and aesthetic values; and,
- Provides recreational sites and trails for the public's use.

Under this activity, the ministry:

- Continued to increase the importance of landscape management in forest resource planning and in mitigating resource-use conflicts;
- Approved, for public review, a discussion paper 'Managing Wilderness in Provincial Forests: A Proposed Policy Framework' -- more than 150 written submissions were received and the policy paper was revised;
- Digitized a provincial inventory of resources information related to wilderness -- including the recreation opportunity spectrum, operable timber lands, mineral potential, and tourism capability -- on a Geographic Information System to ultimately enable the preparation of maps and summary statistics;
- Conducted a pilot survey of B.C. residents in preparation for a 10,000-sample study to be undertaken to estimate the recreational use, value, and demand for recreation on provincial forests; and,
- Initiated the development of the Recreation Opportunity Spectrum poster and a provincial recreation guide.

Expenditures

Forecast expenditures were $11.7 million. Actual expenditures were $10.7 million. The major expenditure was $3.8 million for range management (*Table H-1*).

Effects on clients

The needs and priorities of individuals, regional districts, municipal councils, interest groups (such as the Outdoor Recreation Council of B.C.), industry groups (such as the B.C. Cattlemen's Association and forest licensees), and resource agencies were assessed in resource planning activities.

This interaction responded to diverse concerns and suggestions about forest land-use. Alternative uses were evaluated and allocation, access, and resource conflict issues were addressed.

Weed-control efforts were conducted in co-operation with other provincial ministries, regional governments, and Indian bands.

The recreation management activity provides the public with opportunities for recreational experiences in provincial forests and protects and enhances resource values, which are the basis for the province's $2-billion tourist industry, the forest industry, and the $1-billion recreation sports industry.

It supports the forest industry by enabling timber harvesting in visually sensitive areas through landscape management and by reducing wildfires caused by the diverse recreational use of provincial forests.

It also facilitates the public's recreational use of the forests through the management of resource-use conflicts and by providing a system of rustic, backcountry sites and trails.

Forecasts

To date, high cattle prices have encouraged cattle producers to maintain or increase herd sizes.

Procedures will be developed to ensure grazing management issues are addressed by the pre-harvest silviculture prescriptions, now being prepared by the forest industry as part of its new responsibilities for basic silviculture.

Policies and procedures will be developed to address issues identified in the range program review and the program's focus will be consistent with the review's recommendations.

A detailed internal review of the recreation management activity will be conducted to determine if its focus is consistent with government, industry and public priorities.

Wilderness management will remain a provincial issue; a wilderness policy will be released; the wilderness inventory will be improved; and work will be done co-operatively with other groups to plan and manage the

wilderness resource.

A 100,000-sample survey of B.C. residents will be conducted to estimate use, value and demand for recreation in provincial forests;

A provincial recreation guide and recreational maps will be produced and distributed to the public.

A recreation opportunity spectrum poster will be developed for educational purposes of ministry staff and the public.

The recreation manual will be rewritten, updated and distributed to each ministry office and applicable licensees.

Responsibilities of tree farm licence holders for recreation management will be clarified.

The purposes, roles, policies and development procedures for demonstration forests will be presented as an issue paper for further input.

Any decision to issue more tree farm licences will require a greater planning effort.

Resource planning will increasingly be used to actively co-ordinate timber, range, and recreation resource management and the resource programs of other provincial agencies on an integrated basis.

Resolution of local resource development issues will require integrated resource planning and more public consultation to respond to public concerns.

Inventory

Program description and goals

This program provides:

- Current statistics through periodic re-inventory and depletion updates;
- Forest-cover digital files with geo-referenced inventory data;
- Timber supply analysis to assist in determining the allowable annual cut of timber supply areas, and review of management and working plans for tree farm licences; and,
- Development and calibration of growth models for the projection of forest stands for resource analysis.

The goals were:

- To analyse the impact of four new tree farm licence applications;
- To analyse 15 timber supply areas;
- To review 19 tree-farm-licence management and working plans;
- To digitize 800 forest-cover map sheets with associated overlays and statistics;
- To update 400 previously digitized map sheets for depletions;
- To update 600 undigitized map sheets for not-satisfactorily-restocked areas and forest cover;
- To produce 15 sets of timber-supply-area and tree-farm-licence growth-and-yield coefficients, and decay, waste, and breakage factors;
- To acquire 2,000 growth-and-yield samples;
- To produce 350 area-volume and other statistical reports;
- To generate 17 timber-supply-area area-volume data files for timber supply analyses; and,
- To distribute 6,000 geographic-information-system digital-map-sheet databases to forest regions, forest districts, and the private sector.

Client situation

The program's clients are resource managers and planners in forestry from the private and public sectors.

The existing forest resource inventory was developed over the past 25 years and statistics were produced by public sustained-yield-units to determine the allowable annual cut. Thus the sampling system provided average volumes, which are reliable for large forest units but not for individual stands of trees.

Refinements -- such as the use of site-index equations, adjustments for species composition, and realistic estimation of stand density and/or stocking -- in the classification system are needed to derive stand-specific volume estimates for the clients.

The provincial re-inventory of forest land within timber supply areas provides the detailed forest-cover information necessary to generate up-to-date forest cover statistics and map sheets.

Statistics are provided to managers and planners in the forest districts who require the inventory data for their programs.

Activities

During the year these projects were accomplished:

- Impact analysis of five new tree farm licence applications;
- Analysis of 12 timber supply areas;
- Review of 10 tree-farm-licence management working plans;
- Digitizing of 827 forest-cover map sheets with associated overlays and statistics;
- Updating of 535 previously digitized map sheets for depletions;
- Updating of 342 undigitized map sheets for not-satisfactorily-restocked areas and forest cover;
- Production of 15 sets of timber-supply-area and tree-farm-licence growth-and-yield coefficients, and decay, waste, and breakage factors;
- Acquisition of 2,000 growth-and-yield samples;
- Production of 350 area-volume and other statistical reports;
- Generation of 17 timber-supply-area area-volume data files for timber supply analyses;
- Distribution of 6,000 geographic-information-system digital-map-sheet databases to forest regions, forest districts, and the private sector; and,
- Re-inventory of forest cover on 364 map sheets in six timber supply areas.

Expenditures

Forecast expenditures were $12.3 million. Actual expenditures were $12.3 million. The major expenditure was $3.7 million for inventory maintenance (*Table I-1*).

Effect on clients

Up-to-date and detailed forest cover information is needed in a geo-referenced format for provincial and local planning. In providing this information to clients, the program contributes directly to improved resource management and planning.

Forecast

The program will:

- Complete a timber supply analysis for each timber supply area and tree farm licence on a five-year cycle;
- Design, develop, and implement a 20-year forest resource analysis system by 1990;
- Re-inventory each timber supply area and tree farm licence every 10 years;
- Update each forest-cover map sheet and corresponding descriptive statistics every two years;
- Maintain permanent sample plots for the development of growth projection systems and the supply of realistic growth models for timber supply analysis;
- Convert all forest-cover map sheets into digital form by 1991; and,
- Implement forest resource inventory data on a province-wide geographic information system in each forest district by 1991.

Fire Suppression

Program description and goals

The program minimizes damage from wildfires on forest and range lands and the urban/wildland interface zone. It is closely linked to, and supported by, the forest protection program.

The program supplies regional helitack crews, rapattack services, district firetack crews, unit crews, air tankers, and medium helicopter services through the fire-preparedness activities.

It funds the directs costs of forest-fire control activities, such as the hiring of personnel and equipment, short-term aircraft, and the purchase of fire-fighting materials.

The goal is to limit annual area burned to 69 000 hectares and the volume of timber loss to 2.6 million cubic metres. This goal was achieved: area burned was 11 482 hectares and timber loss was about 546 million cubic metres.

Client situation

The primary clients are other ministry, provincial, and federal government programs. It also serves British Columbians by being principally responsible for forest-fire control services.

Activities

Direct fire-fighting
Funds direct fire-line expenditures: fire-fighters' wages, equipment rentals, aircraft hire, supplies, standby and overtime, and site rehabilitation.

Fire preparedness
Funds those activities in preparation for a fire: training, detection, equipment development, initial attack crews, unit crews, and aircraft availability.

Expenditures

Direct fire-fighting:
Forecast expenditures were $52.2 million. Actual expenditures were $26.9 million. The major expenditure was $6 million for fire support flying (*Table J-1*).

Fire suppression preparedness:
Forecast expenditures were $27.8 million. Actual expenditures were $26.4 million. The major expenditure was $9.3 million for aircraft availability (*Table K-1*).

Effects on clients

The fire season was less than normal with 1,951 fires. The area burned per fire was lower than average.

Lightning-caused fires accounted for 28 per cent of starts. Total area burned was 11 482 hectares. There were 22 fires which exceeded 100 hectares; the largest was 1 305 hectares.

Forecasts

Regional initial-attack, rapattack, and other initial attack forces will remain unchanged; however, greater mobility of these key suppression forces will be carried out.

Specialized 'unit crews' will be expanded to work larger fires more efficiently.

Medium-lift helitankers/rappel helicopters will be contracted and strategically based throughout the province. This will ensure fast, initial-attack resources and reduce the logistic problems of transporting helitack and rapattack crews around the province.

Wildland/urban interface fires will continue to be a problem with ongoing work required to prevent, reduce, and control fires originating or moving into residential areas. Continued co-operation with other government agencies will be stressed.

To enhance mutual aid agreements with other provinces, ongoing changes in fire-line organizations and procedures will be required.

Forest Resource Development Agreement 1985 - 1990

Program description and goals

The Canada-B.C. Forest Resource Development Agreement is a joint initiative of Canadian and B.C. governments. It recognizes the importance of the forest industry to the province's social and economic well-being.

The *1984 Forest and Range Resource Analysis* indicated there were 738 000 hectares of backlog, not-satisfactorily-restocked lands on good and medium sites which were not contributing to forest growth. These lands are categorized as areas harvested, burned by wildfires, or destroyed by pests or other damage, before January 1, 1982.

In addition to these lands, there are many established juvenile stands which need intensive forest management to sustain or improve upon their growth and value.

The agreement's objectives are:

- To manage and reforest part of the backlog of not-satisfactorily-restocked lands;
- To intensively manage selected forest stands;
- To support forestry research by government and non-government organizations; and,
- To assist the forest industry through studies related to use, marketing and product development, technology transfer, and training.

A major portion of the agreement is implemented by the province through a cost-shared component where the federal government shares the cost on a 50-50 basis.

Also, two unilaterally funded components are administered by Forestry Canada and the ministry.

This report contains the accomplishments under the cost-shared component and the ministry's unilaterally funded component.

Client situation

Reforestation of the backlog of not-satisfactorily-restocked lands and incremental forest management of established young stands are important. Without them, the province's economic future will deteriorate:

- Unemployment will increase;
- Income generated by the forest industry will decrease;
- Resource revenues will drop; and,
- Opportunities to diversify the industry will lessen.

Silviculture contractors, the program's specific client group, were fully used during the year in the many field activities. More than 90 per cent of the work under the agreement was carried out by private sector contractors.

Activities

The agreement has three components:

- Backlog reforestation;
- Intensive forest management; and,
- Implementation, communications and evaluation.

Backlog reforestation

This component includes activities to restock the backlog of not-satisfactorily-restocked forest land caused by timber harvests, wildfires, pest, and disease infestations. Activities include surveying, producing seedlings, preparing sites, planting, implementing projects, extension and demonstration of information, and research and development.

Table L-2 gives detailed breakdown of regional accomplishments in these activities.

The accomplishments on Crown lands in 1988-89, relative to goals, were:

Activity	Goals[1]	Accomplishments
	---------- hectares ----------	
Surveying	194 484	261 769
Rehabilitating sites	28 378	27 501
Backlog planting	39 038	37 385
	--number of seedlings--	
Seedlings planted[2]	45,739	41,059

1. Revised goals established by the Canada-B.C. Forest Resource Development Agreement management committee.
2. Number of seedlings planted in thousands.

The surveying of backlog lands for stocking, plantability, survival, free-growing, and stand tending (*Table L-2*) exceeded the goal by 35 per cent.

The rehabilitation of sites was about 1 000 hectares short of the goal. This will not impact future planting goals as fill-in planting and planting without preparing sites are viable alternative treatments.

The planting of 41 million trees on about 37 000 hectares (*Table L-2*), was a 28-per-cent increase in hectares reforested over 1987-88 -- the cost of producing the seeds and seedlings for this planting was about $7.6 million.

The expanded, backlog reforestation effort has increased the need to refine and improve the efficiency of forestry practices essential to the program's success.

'Forestry extension, demonstration, and research and development' is a sub-program of backlog reforestation.

In 1988-89, the program spent about $4.7 million in improving nursery practices, seedling storage and site preparation techniques, reforestation practices and prescriptions, and plantation growth-and-yield research.

A portion of these expenditures was for the prompt demonstration and transfer of information, techniques, and standards to the practicing field forester and client organizations.

The ministry facilitated the communication of research and development results.

As of September 1988, the number of hectares of backlog, not-satisfactorily-restocked lands, on good and medium sites, had been reduced by 25 per cent from 1984 due to the program activities in the past three years.

Increased planting and silviculture surveys have resulted in fewer areas being classed as backlog not-satisfactorily-restocked lands.

Modifications in ecosystem classification, survey procedures, and in silviculture stocking standards resulted in less land being classed as backlog not-satisfactorily-restocked lands.

Incremental forest management
Activities include brushing, controlling pests, freeing older conifers from competition, spacing, fertilizing, and extension, demonstration, and research development.

See Table L-2 for a detailed breakdown of regional accomplishments in these activities.

Accomplishments on Crown lands during 1988-89, relative to goals, were:

Activity	Goals[1]	Accomplishments
	--------- hectares ---------	
Brushing	7 947	10 991
Freeing older conifers from competition	2 837	1 988
Spacing[2]	13 806	16 802
Fertilizing	10 274	11 458
Other[3]	-	1 865

1. Revised goals established by the Canada-B.C. Forest Resource Development Agreement management committee.
2. Includes spacing of young conifers and falling of diseased and damaged trees.
3. Includes pruning, mistletoe control and falling of snags and residual trees.

The ministry, under the direct-funded component, continued to fund research on the growth-and-yield effects of incremental silviculture treatments.

Implementation and communication
This component covers the activities required to ensure the agreement's terms and conditions are adhered to, good forestry is being practised, and the results of this work are communicated to the public.

During 1988-89, the program:

- Invested $3.8 million on developing, supervising, monitoring, and evaluating projects;
- Invested almost $460,000 on developing and producing general forestry information brochures and slide/tape shows, constructing and erecting signs, contracting professional public relations services, and renting or leasing facilities and equipment for presentations.

Expenditures

Forecast expenditures were $69.4 million. Actual expenditures were $65.5 million. The major expenditure was $41.3 million for backlog reforestation (*Table L-1*).

Effects on clients

A mid-term (September 30, 1987) assessment states that areas already treated are estimated to yield at least 340 000 cubic metres of lumber annually. This represents about 1,235 jobs per year, or $44.2 million of the gross domestic product annually.

Over the agreement's full term, the areas treated should produce more than the original projections of 600 000 cubic metres of lumber

annually and will result in more than 500 full-time and 15,000 short-term jobs.

During 1988-89 about 282,000 person-days of work were generated.

Since the program began in May 1985, these accomplishments have been recorded:

- Surveying: 720 000 hectares;
- Rehabilitating sites: 88 000 hectares;
- Planting: 102 000 hectares (119 million trees);
- Brushing: 23 000 hectares;
- Freeing older conifers from competition: 3 600 hectares;
- Spacing young trees: 47 000 hectares;
- Fertilizing: 36 000 hectares.
- Generating jobs: 780,000 person-days or 3,300 person-years

These activities resulted in an increase in productive forest land and improved forest stand values.

The *1988 Summary of Backlog Not-Satisfactorily-Restocked Forest Land* states the amount of backlog not-satisfactorily-restocked land has been reduced to 553 000 hectares from the 1984 estimate of 738 000 hectares.

The reforestation of the backlog of denuded lands will add to the long-run sustained yield of forest land in the province.

With funding through the agreement, spacing, fertilizing, and other stand tending practices will increase the potential yields of second-growth stands, bringing them to harvestable size earlier, and thus maintaining or increasing the allowable annual cut in the province.

This will result in more jobs and more income generated in the province's harvesting, manufacturing, and service industries. In addition, there will be more resource revenues for the province.

Forecasts

The incremental silviculture activities funded under the agreement will continue to be an important part of the silviculture activities on Crown land in 1989-90.

The province is looking forward to negotiations with the federal government for an extension of the program beyond its March 1990 expiry date.

A new agreement would help to reduce further the remaining backlog of not-satisfactorily-restocked lands in the province and increase the value of existing stands to the benefit of British Columbians.

Forest Stand Management Fund

Program description and goals

The Forest Stand Management Fund was established as an account in the consolidated revenue fund to provide continuing appropriation of money for silviculture and other management and enhancement of forests, forest lands and range lands; and, employment and training opportunities in carrying out these activities.

The main activities carried out under the fund include: silviculture; recreation; protection; range; engineering; and, training.

Client situation

The program's general client group -- people on the provincial social assistance recipient program -- were fully involved during the year in the delivery of many field activities under the program.

Activities

The fund was used to fund the forestry enhancement program through which provincial social assistance recipients were employed in various activities.

Through the forestry enhancement program, these accomplishments were achieved:

Activity	Accomplishments
Silviculture[1]	
Surveying	647 hectares
Brushing	533 hectares
Freeing older conifers from competition	76 hectares
Spacing	586 hectares
Fertilizing	3 hectares
Rehabilitating sites	37 hectares
Other[2]	474 hectares
Recreation:	
Maintaining trails	43 kilometres
Constructing trails	10 kilometres
Cutting firewood	85 cords
Protection:	
Abating hazards	576 hectares
Range:	
Maintaining fences	10 kilometres
Engineering:	
Maintaining roadsides	15 kilometres

1. Table M-2 outlines the silviculture accomplishments by forest region.
2. Includes pruning, controlling mistletoe and falling snags and residual trees.

Persons employed under this program also received training in survival first aid, accident prevention, power-saw operation and other forestry-related training.

During 1988-89, the ministry was responsible for:

- Identifying and laying out treatment areas; and,
- Inspecting and supervising work quality.

Expenditures

Forecast expenditures were $2.5 million. Actual expenditures were $2.6 million, excluding employee benefits (*Table M-1*).

Effects on clients

In 1988-89, about 18,000 person-days of work generated by the fund.

Forecasts

Next year, the ministry will continue to use the fund to:

- Carry out silviculture and other activities to manage and enhance forest and range lands; and,
- Provide forestry jobs and training for persons on the provincial social assistance recipient program.

Small Business Forest Enterprise Program

Program description and goals

Through this program, Crown timber is sold to individuals and firms that are registered or qualified to register under the program.

The program has three main goals:

- New opportunities: through timber sales, the program provides opportunities for individuals and firms to enter the forest industry and establish new businesses;
- Diversification and jobs: timber is sold to promote and stimulate the production of specialty and higher valued forest products -- sales to encourage value-added uses of timber are expected to lead to further diversification of the forest industry and increased regional jobs; and,
- Competition and profit: timber marketing through a competitive process ensures that the most effective firms are awarded timber sales and the province receives a fair rate of return for the forest resource.

Client situation

The program serves two main client groups.

The primary clients are those individuals and firms registered in the program and competing for advertised timber sales. This group consists of timber harvesters, sawmill owners, lumber remanufacturers, and specialty product manufacturers.

They are registered in one of two categories: Category 1 for those who do not own or lease a timber-processing facility, and Category 2 for those who do own or lease a timber-processing facility.

There were more than 2,400 registrants on March 31, 1989 (Table N-3). Approximately 85 per cent of the individuals and firms were registered in Category 1.

The secondary clients are the contractors who construct roads, reforest land, measure and protect the timber resource, and assist in the planning of forest management activities.

The silviculture contractors were used fully during the year in the delivery of many field activities under the program.

Field operations for all ministry activities were mainly done by contracting the work to the private sector.

Activities

During the year, amendments to the *Forest Act* and a new Small Business Forest Enterprise Regulation resulted in an expansion of the program and in new objectives.

New legislation

The amendments to the *Forest Act* provided for a doubling of the timber available under the program to about 15 per cent of the harvest from Crown land.

The amendments also introduced 'bid proposal' timber sales, designed to promote and encourage lumber remanufacturing and the production of specialty products.

The Small Business Forest Enterprise Account was also established to receive all revenues from the program's timber sales and to finance all the necessary expenditures of program activities. The account places the program in a self-financing position.

Finally, a new section allows for the disqualification of individuals and firms that give false information or fail to comply with the terms of the timber sale licences awarded.

Regulations

The new *Small Business Forest Enterprise Regulation* permits easier entry into the program for firms and individuals.

Changes to Category 2 requirements now permit joint ventures between registrants and major licensees, provided the major licensee does not have controlling interest in the joint venture.

The regulation also introduced a $250 registration fee, instead of $100, but extended the registration period from two years from one.

Program registrants are now allowed to hold three timber sales at any time, instead of two.

The *Silviculture Regulation* requires that basic silviculture be carried out on the program's areas. The treatments include:

- Restocking of denuded areas by planting

and seeding, and restocking areas naturally by seeding;
- Preparing sites to promote natural restocking and to facilitate planting;
- Brushing on some stands to ensure unimpeded seedling growth and that the stand is free-growing;
- Spacing of interior dry-belt Douglas-fir and lodgepole pine stands exceeding maximum allowable densities; and,
- Monitoring of growth and survival is performed on an operational basis by surveying lands.

Seminars
Eight seminars were held throughout the province to introduce the concept of 'value-added' manufacturing to prospective investors and established entrepreneurs. New policies on timber sales were explained.

Volume sold
A total of 10.6 million cubic metres of timber was sold during 1988-89 (*Table N-3*), and this timber had a value, at the time of sale, of more than $185 million.

Work to support timber sales
Most of the work necessary to support the program's timber sales was conducted by contractors. Some of the accomplishments were:
- Road construction: 887 kilometres; and,
- Timber cruising: 13.5 million cubic metres.

Silviculture
Forest land denuded after January 1, 1988, was restocked under the program. Activities included surveying, site preparation, planting and brushing.

Accomplishments on Crown lands, relative to goals, were:

Activity	Goals[1]	Accomplishments
	--------- hectares ---------	
Surveying	19 234	28 225
Preparing sites	8 818	6 953
Planting	335	603
Brushing[2]		37
Spacing[3]	-	102
Other[4]	-	644
	-- number of seedlings --	
Seedlings planted	350,000	561,000

1. Regional revised targets.
2. Small Business Forest Enterprise Account funds only
3. Includes spacing of young conifers and falling of diseased or damaged trees.
4. Includes pruning, controlling mistletoe and falling snags and residual tree.

Table N-5 outlines these accomplishments by forest region while Table Q-8 shows average costs of basic silviculture treatments.

Silviculture audit
Silviculture audits are required to be conducted on at least five per cent of the Small Business Forest Enterprise areas that have been declared as free-growing in any one year.

In 1988-89 a total of 100 licences covering a total of 3 897 hectares of ministry responsibility areas were audited. Table N-4 summarizes the audits conducted in each region.

Under the 'Basic Silviculture in Progress' portion of the 'Basic Silviculture Performance,' it was determined that all areas are likely to meet free-growing status within the time specified in the 'pre-harvest silviculture prescription' with the exception of three areas in the Prince Rupert Region. Measures to meet obligations were implemented.

Program management

The program is managed on a self-financing basis.

Under the program, the ministry assumes responsibility for the construction of forest roads and bridges, silviculture, and other forest management requirements that are incidental to operations that yield small business revenue.

The Small Business Forest Enterprise Account receives all revenues and is the source of funding for all program expenditures.

Revenue in excess of funds required for current expenditures and future silviculture obligations is returned on an annual basis to the province's general fund.

An annual business plan outlines the program's revenue goals and expenditure limits.

Program performance is monitored through quarterly reports submitted to Treasury Board.

Expenditures

Forecast expenditures were $53.1 million. Actual expenditures were $46.5 million.

These expenditures were:

- Administration $16.1 million;
- Harvesting:
  - Timber sales: $4.8 million;
  - Roads: $22.5 million;
- Silviculture: $2.8 million;
- Protection: $0.4 million.

The major expenditure was for the construction of roads to provide access to future timber sales.

Silviculture expenditures were low but will increase substantially in future years. The Small Business Forest Enterprise Account pays for reforestation of land harvested after January 1, 1988, and as the land is ready for reforestation, expenditures will increase.

Revenues

Revenue for 1988-89 totalled $134.5 million (*Table 1*), based on a total timber volume billed of 9.5 million cubic metres:

- Stumpage billed: $117.9 million;
- Accrued billings: $14.9 million;
- Annual fees and billings: $1.7 million.

More information on stumpage billed is in Table N-2.

Revenues exceeded expenditures by $88 million. After taking into account the opening balance of $37.7 million, and reserving funds for the silvicultural liability of $31.6 million, the Small Business Forest Enterprise Account returned $94 million to the government's general fund.

Effects on clients

There were increased opportunities for registrants to compete for timber and more work for contractors due to the expansion of the program

The demand for all sales was very strong. This is demonstrated by the high bonus bids for many competitive sales and the increasing number of applications received for bid proposal sales.

As the program expanded during the year, the amount of contract work expanded. Roadbuilding, cruising and layout work done by specialized contracting firms increased significantly.

In silviculture alone, about 11,000 person-days of work was generated.

Forecasts

Demand for the timber offered for sale is expected to remain strong.

Expenditures in the next few years are expected to increase, particularly silviculture expenditures, as the land base from timber sales awarded since January 1, 1988, becomes ready for reforestation.

In the next year, the number of bid proposal sales will increase significantly as the government works to encourage the further manufacturing of forest products.

Silviculture -- private sector

Program description and goals

The program involves restocking areas denuded by the private sector from major licences harvested after October 1, 1987, and from royalty-bearing timber licences.

Silviculture treatments are completely implemented and funded by the private sector.

The *Silviculture Regulation* requires basic silviculture to be carried out on all major licence areas.

Client situation

The program's general client group, the province's private sector, and its specific clients -- the silviculture contractors -- were used to the fullest extent during the year in the delivery of the majority of field activities under the program.

Activities

Basic silviculture

This component involves restocking forest land denuded by the private sector from major licences harvested after October 1, 1987, and from royalty-bearing timber licences. Activities include surveying, preparing sites, planting, brushing and spacing.

Accomplishments on Crown lands were:

Activity	Accomplishments
	-hectares-
Surveys	36 838
Preparing sites	59 775
Planting	7 992
Brushing	4 643
Spacing[1]	257
Other[2]	151
	--- number of seedlings---
Seedlings planted	8,176,000

1. Includes spacing of young conifers and falling of diseased and damaged trees.
2. Includes pruning, controlling mistletoe, and falling snags and residual trees.

Table P-2 outlines these accomplishments by forest region while Table Q-8 shows average costs of basic silviculture treatments.

Effects on clients

In 1988-89, about 68,500 person-days of silviculture employment were generated by activities funded by the private sector.

Forecasts

The private sector will continue to be responsible for carrying out basic silviculture on areas harvested under major licences.

Silviculture activities funded by the private sector will continue to increase. In the near future, the majority of silvicultural activities in B.C. will be funded and implemented by the private sector.

Silviculture audit

Silviculture audits are required to be conducted on at least five per cent of the major licensee areas that have been declared as free-growing in any one year.

In 1988-89, a total of 111 licences covering a total of 9 174 hectares of licensee responsibility areas were audited. Table P-3 summarizes audits conducted in each region.

Under the 'Basic Silviculture in Progress' portion of the 'Basic Silviculture Performance,' all areas were determined as likely to meet free-growing status within the time specified in the 'pre-harvest silviculture prescription,' with the following exceptions:

- One licensee responsibility area in the Prince Rupert Region appears unlikely to meet free-growing status. Measures to meet obligations have been implemented;
- One area in the Prince George Region appears unlikely to meet free-growing status. The 'pre-harvest silviculture prescription' has been amended to reflect changes.

Silviculture activity summary

This report is a summary of all silviculture activities under:

- Silviculture program under Ministry Operations (Vote 41) -- page 11
- Forest Resource Development Agreement -- page 24
- Forest Stand Management Fund -- page 27
- Small Business Forest Enterprise Account -- page 28
- Silviculture -- private sector -- page 31

Program description and goals

The program, as outlined in the Silvilculture program under Ministry Operations (page 11) involves restocking denuded forest lands and improving the value and productivity of forest stands.

The program on Crown land is funded by various sources (*Table Q-1*), including:

- The provincial funding for Ministry Vote (*Table E-1*);
- The Canada-B.C. Forest Resource Development Agreement (*Table L-1*);
- The Forest Stand Management Fund (*Table M-1*);
- The Small Business Forest Enterprise Program (*Table N-1*);
- The South Moresby Implementation Account (*Table O-1*); and,
- Federal job-creation programs and the provincial Corrections Program (*Table Q-1*);

Each of these funding programs are detailed in their own sections in this report.

This section summarizes the total silviculture accomplishments in the province in 1988-89.

Using all funding sources in 1988-89, ministry and licensees were responsible for:

- Surveying (*Table Q-2*): 680 000 hectares;
- Preparing sites (*Table Q-3*): 138 000 hectares; and,
- Planting on Crown and private lands (*Table Q-4 and Q-5*):

Land status	Millions of trees	Hectares planted
Crown land	195.3	165.4
Private land	3.4	4.1
Totals	198.7	169.5

- About 78 per cent of the planting was on areas recently denuded (basic silviculture); the rest was on areas denuded before 1982 (incremental silviculture);
- A variety of species were planted on Crown land (*Table Q-6*) -- predominant were interior spruce and lodgepole pine;
- Brushing (*Table Q-7*) was done on almost 36 000 hectares of Crown land; brushing has increased over the last 10 years and more increases are anticipated; ministry studies indicate about 80 000 hectares need to be treated annually to protect initial silviculture investments and to ensure unhindered tree-growth;
- To improve the value and productivity of forest lands:
  - Older conifers on about 2 000 hectares were freed from competition;
  - Spacing of trees was carried out on 21 000 hectares; and,
  - Stands on 11 000 hectares were fertilized (*Table Q-2*);
- Rehabilitation of sites was carried out on 28 000 hectares (*Table Q-2*); and,
- Pruning, controlling mistletoe, falling snags and residual trees, falling of diseased and damaged trees, and eliminating seed-trees were carried on 7 000 hectares (*Table Q-2*).

New silviculture regulation

On April 1, 1988, the *Silviculture Regulation* came into effect. It outlines a major licensee's obligation to carry out basic silviculture according to a 'pre-harvest silviculture prescription.'

More accomplishments

Graphs 1-8 illustrate the silviculture accomplishments from 1979 to 1988-89. Most silvilcultural activities have tripled in the past 10 years.

Silviculture surveys, preparation of sites, planting, and brushing will continue to expand to meet the ministry's basic silviculture obligations and the goal to restock, by year 2000, the remaining good and medium sites that were denuded before 1982 and are not satisfactorily restocked.

Because of the need to properly plan and monitor silviculture activities, silviculture survey work has tripled in the past 10 years on Crown land (*Graph 1*).

Annual preparation of sites increased from 53 000 hectares in 1979 to more than 137 000 hectares in 1988-89 (*Graph 2*).

In 1979, about 53 000 hectares of Crown land were planted. In 1988-89, more than 165 000 hectares were planted (*Graph 3*). A large proportion of the total planting program was funded by the Canada-B.C. Forest Resource Development Agreement.

Brushing activities increased from 2 500 hectares in 1979 to almost 36 000 in 1988-89. Brushing treatments will continue to rise, particularly due to requirements in the *Silviculture Regulation* for the ministry and licensees to establish healthy, free-growing forests (*Graph 4*).

The spacing of young conifers and the falling of diseased and damaged trees have been primarily funded through the Canada-B.C. Forest Resource Development Agreement in the past few years. However, the Forest Stand Management Fund, the federal job-creation programs, and the provincial Corrections Program have also provided funds (*Graph 5*). In the future, there will be more spacing of young conifers -- dry-belt Douglas-fir and lodgepole pine -- as part of basic silviculture.

Fertilizing of stands will be maintained at 11 000 hectares per year over the next few years (*Graph 6*).

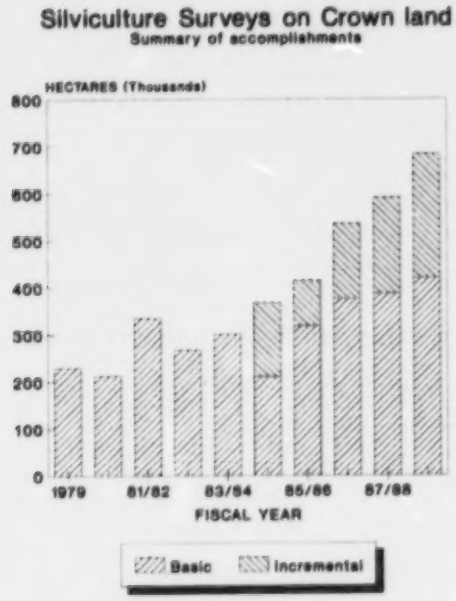
There has been a steady increase in the rehabilitation of sites over the past 10 years. The Canada-B.C. Forest Resource Development Agreement has been responsible for funding the majority of this work in the past four years (*Graph 7*).

Also under the agreement, increased funding for activities that ensure that young conifers survive has resulted in reduced competition from undesirable brush species on older stands (*Graph 8*).

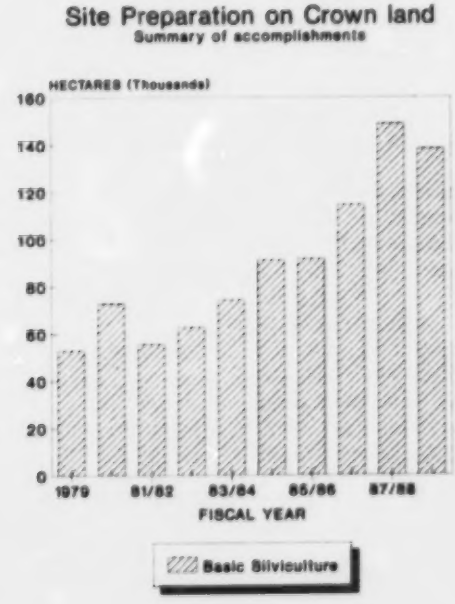
Planting began in B.C. in 1930. It took 44 years to plant half a billion trees. By 1981, one billion trees had been planted. In 1989, the province will plant its two-billionth seedling (*Graph A*). It will take only four more years before the three-billionth seedling is planted.

Until 1974, the majority of tree planting was on the B.C. coast. From 1974 to 1988-89 the majority of planting has been in the B.C. interior (*Graph B*).

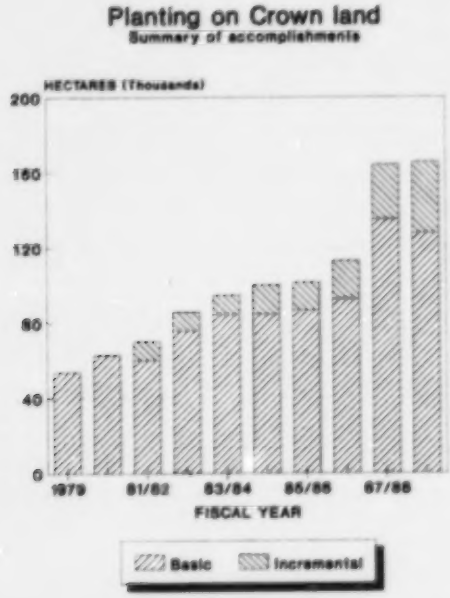
Graph 1 — Silviculture surveying on Crown land: tripled in the last 10 years to meet the need for proper planning and monitoring of silvicultural activities.



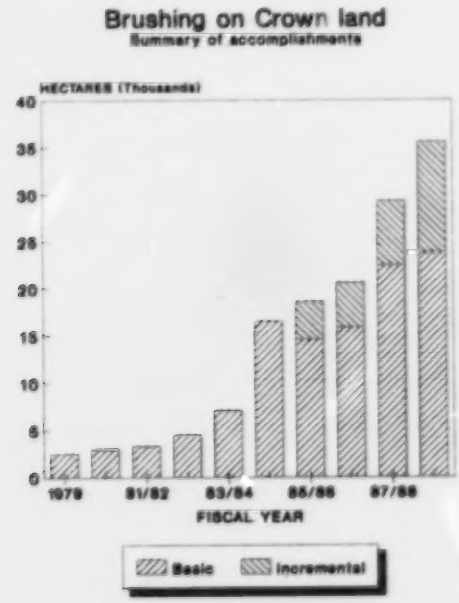
Graph 2 — Preparing sites on Crown Land: increased from 53 000 hectares in 1979 to more than 124 000 hectares in 1988-89.



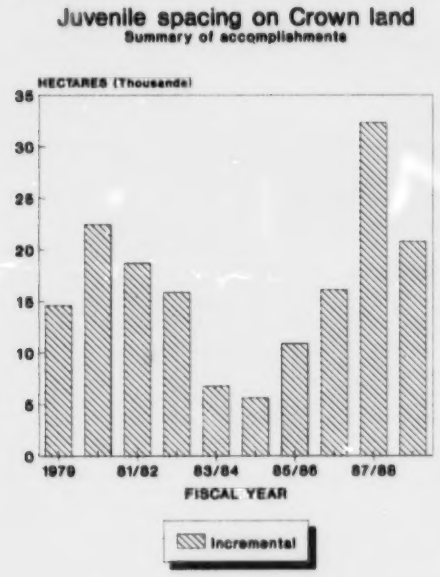
Graph 3 — Planting on Crown land: increased from 53 000 hectares in 1979 to 165 000 in 1988-89 -- a large portion of this activity is funded by the Canada-B.C. Forest Resource Development Agreement.



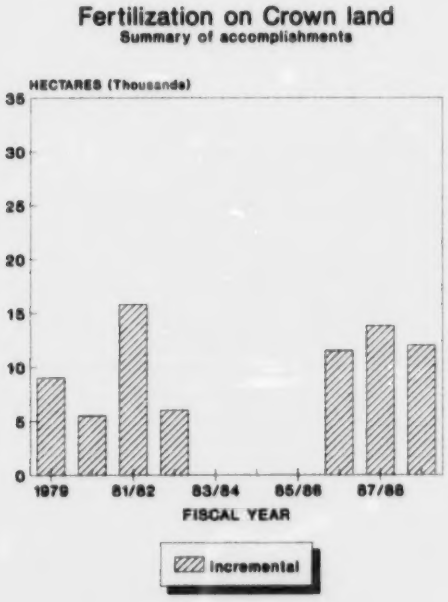
Graph 4 — Brushing on Crown land: increased from 2 500 hectares in 1979 to 34 000 hectares in 1988-89 -- this treatment will continue to increase because of the requirements in the *Silviculture Regulation* for ministry and licensees to establish healthy, free-growing forests.



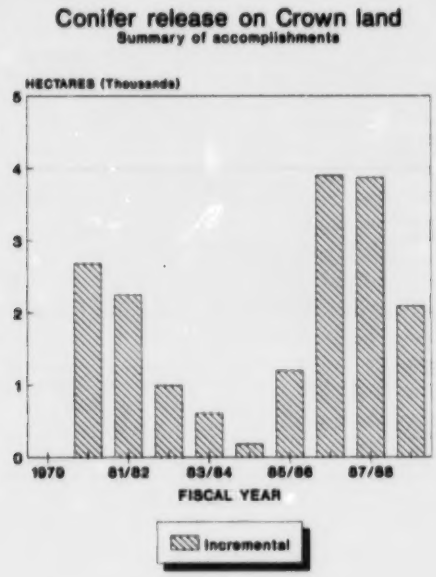
Graph 5 — Spacing of young conifers on Crown land: the spacing of young conifers and the falling of diseased and damaged trees are funded by the Canada-B.C. Forest Resource Development Agreement, the Forest Stand Management Fund, the Canada Job Strategy program, and the provincial Corrections Program. In the future, more spacing of young conifers will be carried out in the dry-belt, Douglas-fir and lodgepole pine stands as part of basic silviculture.



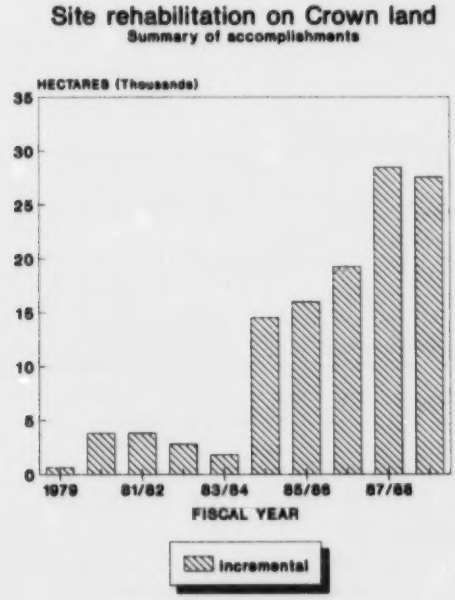
Graph 6 — Fertilizing on Crown land: will be maintained at 11 000 hectares per year over the next few years.



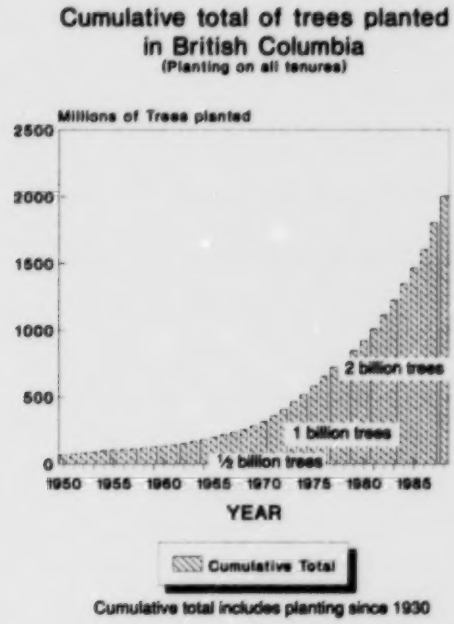
Graph 7 — Rehabilitating sites on Crown land: steadily increased over the past 10 years -- the Canada-B.C. Forest Resource Development Agreement has funded this activity for the past four years.



Graph 8 — Freeing older conifers on Crown land from competition: more funds have been spent, under the Canada-B.C. Forest Resource Development Agreement, to reduce brush competition on older stands.



Graph A — Cumulative total of trees planted – planting on all tenures: planting began in B.C. in 1930. It took 44 years to plant half a billion trees. By 1981, one billion trees were planted. In 1989, the province will be planting its two-billionth tree. It will take only four more years before the three-billionth seedling is planted.



Graph B — Number of trees planted each year in B.C.: until 1974, the majority of tree planting was on the coast. From 1974 to 1988-89, most of the planting has been in the interior.

Expenditures

Provincial silviculture expenditures on Crown land for 1988-89 by funding source are:

Funding Source	Expenditures
	-- '000 --
Ministry Vote	$134,075
Forest Resource Development Agreement	60,372
Forest Stand Management Fund	2,576
Small Business Forest Enterprise Account	2,817
South Moresby Forest Replacement Account	787
Other[1]	1,292
Total	$ 201,919

1 Other funding sources represent the values of silvicultural accomplishments by federal job creation programs ($909,000) and the provincial Corrections Program ($383,000).

Table Q-1 outlines these expenditures by forest region.

Effects on Clients

In 1988-89, silviculture work on Crown land generated 866,000 person-days -- or 3,500 person-years -- of employment in 1988-89 through all funding sources. Here is the breakdown:

	Person-days
• Ministry Vote for silviculture operations:	507,000
• Basic silviculture funded by the Small Business Forest Enterprise Account:	11,000
• Basic silviculture funded by the private sector:	68,500
• Incremental silviculture funded by the Forest Stand Management Fund:	18,000
• The Canada-B.C. Forest Resource Development Agreement:	282,000
• Other sources:	6,000

Total silviculture activity will continue to expand over the next few years.

In the future, the private sector will be responsible for more provincial silviculture activities. There will be a greater effort from ministry staff, contractors, and consultants in monitoring licensees' operations by auditing achievements.

More backlog of good and medium sites, denuded before 1982, will be reforested and existing stands will continue to be improved in productivity and value.

The ministry is urging renewal of the Canada-B.C. Forest Development Agreement to an enhanced level of $700 million over five years, expended as a 50-50 cost-shared effort.

There are about 3 779 000 hectares of not-stocked land in the province (*graph C*).

There are five categories of not-stocked areas:

- Areas denuded between 1982 and October 1, 1987, that will be reforested through the Ministry Operations (Vote 41): 26 per cent;
- Areas denuded under the Small Business Forest Enterprise Program since January 1, 1988: one per cent;
- Areas denuded by the private sector since October 1, 1987: three per cent;
- Areas denuded before 1982 and eligible for treatment under the Canada-B.C. Forest Resource Development Agreement; 15 per cent; and,
- Areas denuded before 1982, which are inaccessible, requiring reclassification, have stocking in progress, or are not considered a management priority: 56 per cent.

About two-thirds of the low-priority, not-stocked land are in the remote Cassiar, Fort Nelson, Fort St. John and Dawson Creek timber supply areas.

A majority of this not-stocked land was created through wildfires and other pest problems. Much of the low-priority, not-stocked land is covered in aspen.

Recent changes in aspen merchantability have resulted in a renewed interest in the species.

It is anticipated that there are significant not-stocked areas that when resurveyed will be found to be satisfactorily restocked in aspen.

The data in Graph C will be the basis of future reports detailing the change in status of not-stocked land in the province.

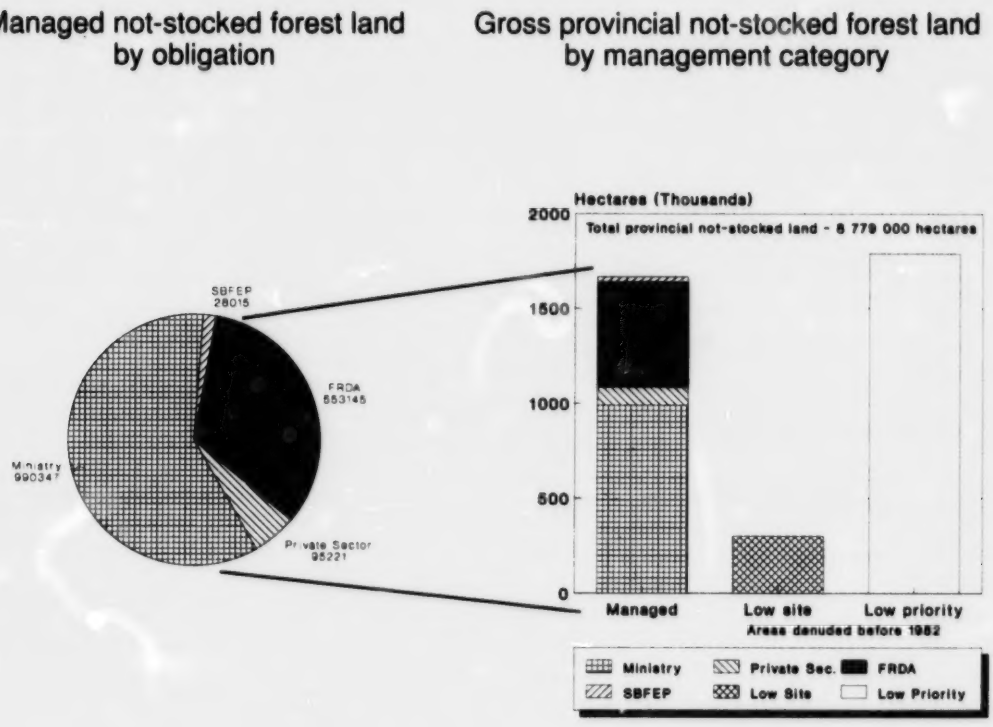
Silviculture audit

The *Forest Act* authorizes a silviculture audit to be carried out on areas harvested under a licence agreement. The *Ministry of Forests Act* requires a statement of audits made on basic silviculture to be included in this annual report.

Silviculture audits are required to be conducted on at least five per cent of the major licensee and Small Business Forest Enterprise areas that have been declared as free-growing in any one year.

In 1988-89, 207 licences covering a total of 12 672 hectares of ministry and licensee responsibility areas were audited. Tables N-4 and P-3 summarize the audits conducted in each region.

Graph C — Not-satisfactorily-restocked land -- summary of Crown land only.



Low priority refers to backlog (pre 1982) NSR that is inoperable, inaccessible or is uneconomic for treatment.
Natural restocking is in progress on many of these areas.

Key to obligation categories:
SBFEP — areas denuded after January 1, 1988.
Private Sector — areas denuded after October 1, 1987.
Ministry — areas denuded between 1982 and October 1, 1987.
FRDA — good and medium site areas denuded prior to 1982.

The amount of NSR in the managed forest land class represents the beginning status for a 'net change' analysis to be presented in the 1989-90 annual report.

III. Summary Financial and Statistical Tables

Note: All financial data for 1988-89 contained in Section III is based on an accrual accounting system and is unaudited.

Table 1: Revenue in 1988-89, by category and by region

Category	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Stumpage	$31,052	$43,952	$28,179	$122,132	$37,435	$130,913	-	$393,663
Small Business Forest Enterprise	12,143	18,489	9,259	42,303	18,493	33,769	-	134,456
Royalty and Export	-	1,006	672	276	4,250	55,906	-	62,110
Rents	2,103	2,101	1,822	3,687	2,445	8,083	$ 666	20,907
Interest	155	380	480	1,839	278	1,187	5	4,324
Scaling	201	244	213	367	261	1,538	-	2,824
Range	565	601	136	269	50	5	-	1,626
Other	39	176	16	747	47	321	2,386	3,732
Totals	$46,258	$66,949	$40,777	$171,620	$63,259	$231,722	$3,057	$623,642

Table 2: Expenditure and full-time equivalents (FTEs) in 1988-89, by source of funds[1]

Source of funds	Expenditure[2]		Full-time equivalents[3]	
	Forecast[4]	Actual	Forecast	Actual
	'000		FTEs	
VOTE 40:				
A. Minister's Office	$ 304	$ 224	6.00	5.76
VOTE 41: Ministry Operations				
B. Management Services[5]	48,005	47,413	217.35	180.86
C. Program Administration[5]	38,430	36,569	804.18	799.09
D. Harvesting[5]	42,912	42,866	877.72	805.24
E. Silviculture	145,532	134,075	751.66	626.16
F. Research	9,466	9,466	169.84	161.77
G. Forest Protection[5]	19,015	18,952	282.74	292.47
H. Integrated Resource Management	11,734	10,720	186.60	158.34
I. Inventory[5]	12,340	12,340	139.51	128.95
VOTE 42: Fire Suppression				
J. Direct Fire Fighting	52,195	26,828	-	-
K. Fire Suppression Preparedness	27,805	26,443	26.40	39.88
VOTE 43: Forest Resource Development Agreement (ERDA)	69,404	65,513	-	-
Totals (voted)	$477,142	$431,409	3,462.00	3,198.52
Special Accounts (Statutory):				
M. Forest Stand Management Fund[6]	2,700	2,576	-	-
N. Small Business Forest Enterprise	53,100	46,519	-	-
O. South Moresby Implementation[7]	34,800	975	-	-
Totals (Ministry)	$567,742	$481,479	3,462.00	3,198.52

Notes:

1. Includes $20.923 million in employee benefits distributed among programs.
2. Includes a reduction of $3.31 million per Treasury Board directive ($2.31 million in Management Services and $1.0 million in Integrated Resource Management).
3. The concept of full-time equivalent (FTE) is based upon the normal working hours of one full-time employee for a one-year period (1,827 hours) and is used to account for all personnel on a similar basis.
4. Amounts shown reflect the final allocation for the year and include all transfers approved by Treasury Board and the ministry's executive during the year.
5. Includes a transfer of forecast expenditures from Management Services ($2.215 million), Program Administration ($3.5 million), Protection ($1.8 million), and Inventory ($1.0 million), to Harvesting ($8.515 million) for the Industry Development and Marketing sub-program. Actual expenditures of $7.457 million were transferred from Program Administration to Harvesting, including $6.7 million for grants. FTEs transferred from Program Administration to Harvesting were 15 (forecast) and 11 (actual).
6. Includes a $2.55 million increase, approved by Treasury Board, to the Forest Stand Management Fund ($1.9 million from the opening fund balance derived from prior years' surpluses and $0.6 million from the Consolidated Revenue Fund via Special Warrant).
7. There were relatively few expenditures made against the forecast amount due to inconclusive negotiations regarding compensation to the forest companies involved.

Table 3: Expenditures in 1988-89, by category and by region

Category	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
	'000							
Wages and salaries	$ 9,456	$12,071	$11,587	$13,427	$10,517	$18,083	$33,375	$108,516
Employee benefits	-	-	-	-	-	-	20,923	20,923
Professional services	17,400	25,131	21,173	46,502	24,514	29,043	15,054	178,817
Other expenses[1]	9,578	11,308	12,425	14,536	11,881	12,737	100,758	173,223
Totals	$36,434	$48,510	$45,185	$74,465	$46,912	$59,863	$170,110	$481,479

Notes:
1. Includes $18.402 million paid to the B.C. Buildings Corporation for occupancy charges incurred throughout the province.

Table 4: Productive forest land[1] in 1988-89 in timber supply areas and tree farm licences, by region

Region	Mature timber[3]	Immature timber[3]	Not stocked[2]	Totals
	'000 hectares			
Cariboo	3 565	2 217	157	5 939
Kamloops	2 431	1 788	227	4 446
Nelson	1 396	2 043	210	3 649
Prince George	9 557	5 784	2 080	17 421
Prince Rupert	6 389	2 097	907	9 393
Vancouver	3 402	1 457	198	5 057
Totals	26 740	15 386	3 779	45 905

Notes:
1. Source: 1988-89 Inventory Branch reports. Includes only productive forest land on which timber harvesting is restricted partly or wholly by factors such as timber quality, accessibility and environmental sensitivity. Excludes:
   - Crown forest land in timber licences;
   - all private land;
   - all federal land;
   - provincial parks and miscellaneous reserves; and,
   - non-productive and non-forest lands.

   The total area of the province is 98.8 million hectares.
2. Not stocked includes not-satisfactorily-restocked areas on which forest stands have been disturbed by harvesting, wildfire or other causes and have not been restocked with sufficient trees of acceptable commercial species. The area for not-satisfactorily-restocked lands includes current and backlog (pre-1982) not-satisfactorily restocked lands. The increase in area is attributable to current disturbances. Anticipated regeneration delay may be between one and seven years on current not-satisfactorily-restocked lands. Also includes non-commercial brush areas that have been 60 per cent or more covered by brush one or more metres high.
3. Stands with lodgepole pine and whitebark pine or a deciduous species as the leading species are immature if the stand age is 80 years or less; when the stand age is greater than 80 years the stand is mature. Otherwise, all stands having conifers other than lodgepole pine and whitebark pine as the leading species are immature when stand age is 120 years or less; when the stand age is greater than 120 years, the stand is mature.

Table 5: Deletion of land from provincial forests in 1988-89, by region

Region	Designated use of land deleted					
	Agriculture	Industry and transportation	Parks and recreation	Settlement	Other	Totals
	hectares					
Cariboo	1 057	-	-	283	-	1 340
Kamloops	2	-	-	51	1	54
Nelson	78	6	21	5	-	110
Prince George	1 403	284	-	-	-	1 687
Prince Rupert	-	-	-	2	1 655*	1 657
Vancouver	1	168	162	18	-	349
Totals	2 541	458	183	359	1 656	5 197

* Indian cut-off lands.

IV. Detailed Financial Tables

NOTE: All financial data for 1988-89 contained in Section IV is based on an accrual accounting system and is unaudited.

Table A-1: Minister's office expenditures in 1988-89, by category of expenditure

Category	Totals
	--'000
Salaries	$161
Employee benefits	37
Professional services	8
Other expenses	18
Total	$224

Table B-1: Management Services expenditures in 1988-89, by activity

Activity	Totals
	--'000
Deputy minister's office	$ 205
Assistant deputy minister's office	249
Financial Services	2,350
Relocation and job interviews	1,919
Employee benefits	902
Human Resources	1,531
Audit Services	373
Information Systems[1]	13,833
Technical and Administrative Services	25,142
Public Affairs and Library Services	879
Legal Services	30
Total	$47,413

Note:
1. Includes $3.748 million in systems development projects.

Table C-1: Program Administration expenditures in 1988-89, by activity and region[1]

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
	'000							
Management	$1,406	$1,947	$1,723	$2,074	$1,826	$2,377	$ 783	$12,136
Finance	581	1,660	1,171	1,869	1,369	2,203	1	8,854
Personnel	118	149	150	90	125	138	-	770
Systems	172	66	119	175	243	162	-	937
Technical and administrative services	1,563	1,328	1,361	1,391	1,518	2,240	-	9,401
Employee benefits	-	-	-	-	-	-	4,471	4,471
Totals	$3,840	$5,150	$4,524	$5,599	$5,081	$7,120	$5,255	$36,569

Note:
1. Excludes $7.457 million transferred to the Harvesting Program for the Industry Development and Marketing sub-program.

Table D-1: Harvesting expenditures in 1988-89 by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
	'000							
Timber valuation[1]	$ 749	$1,026	$ 748	$1,047	$ 995	$3,780	$ 3,047	$11,392
Timber management[2]	84	308	1,130	691	(935)	(1,419)	505	364
Timber policy	-	-	-	-	-	-	2,192	2,192
Industry development and marketing	-	-	-	-	-	-	7,457 [3]	7,457
Engineering and roads	1,825	1,908	2,434	2,954	2,774	2,946	939	15,780
Employee benefits	-	-	-	-	-	-	5,681	5,681
Totals	$2,658	$3,242	$4,312	$4,692	$2,834	$5,307	$19,821	$42,866

Notes:
1. Includes $4.151 million in scaling expenditures.
2. Excludes $16.064 million transferred to the Small Business Forest Enterprise Program for administration expense (see Table N-1).
3. Transferred from Program Administration.

Table E-1: Silviculture expenditures (Ministry Vote only) in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration	$ 1,535	$ 2,413	$ 2,018	$ 2,955	$ 1,802	$ 3,740	$ 2,986	$ 17,449
Basic silviculture	153	199	8,675	935	1	34	-	9,997
Intensive silviculture	-	-	8	30	-	3	-	41
Seed operations	-	-	-	-	-	-	4,233	4,233
Nursery operations	-	-	-	-	-	-	24,473	24,473
Ministry and industry outstanding activity[1]	8,505	13,045	1,071	24,683	14,288	12,160	-	73,752
Employee benefits	-	-	-	-	-	-	4,130	4,130
Totals	$10,193	$15,657	$11,772	$28,603	$16,091	$15,937	$35,822	$134,075

Note:
1. Basic silviculture for areas harvested from 1982 to 1987.

Table F-1: Research expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Management and support	-	-	-	-	-	-	$2,117	$2,117
Forest renewal	-	-	-	-	-	-	1,770	1,770
Integrated resource management	-	-	-	-	-	-	1,095	1,095
Production and decision aids	-	-	-	-	-	-	548	548
Regional sciences	$391	$374	$408	$376	$609	$604	-	2,762
Employee benefits	-	-	-	-	-	-	1,174	1,174
Totals	$391	$374	$408	$376	$609	$604	$6,704	$9,466

Table G-1: Forest Protection expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration	$ 336	$1,261	$ 436	$ 784	$ 841	$ 760	$ 385	$ 4,803
Fire management	589	325	784	635	563	289	247	3,432
Pest management	288	261	410	150	219	134	509	1,971
Air operations	98	129	105	132	109	126	112	811
Planning development and research	-	-	-	-	-	-	284	284
Emergency bark beetle program	468	2,156	1,083	1,161	880	4	96	5,848
Employee benefits	-	-	-	-	-	-	1,803	1,803
Totals	$1,779	$4,132	$2,818	$2,862	$2,612	$1,313	$3,436	$18,952

Table H-1: Integrated Resources Management expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration	-	-	-	-	-	-	$ 1,048	$1,048
Planning	$ 243	$ 150	$ 445	$ 149	$184	$197	104	1,472
Range management	801	1,051	549	764	253	2	363	3,783
Recreation management	509	660	480	536	318	615	80	3,198
Employee benefits	-	-	-	-	-	-	1,219	1,219
Totals	$1,553	$1,861	$1,474	$1,449	$755	$814	$2,814	$10,720

Table I-1: Inventory expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration	-	-	-	-	-	-	$ 261	$ 261
Map loading/ digitizing	-	-	-	-	-	-	1,469	1,469
Periodic re-inventory	$372	-	-	$1,067	$ 369	$ 98	-	1,906
Tree farm licences	75	-	-	-	-	474	591	1,140
Inventory maintenance	171	$581	$812	498	262	828	500	3,682
Growth and yield	48	20	-	182	502	289	-	1,041
Statistics	-	-	-	-	-	-	425	425
Forest resource analysis	-	-	-	-	-	-	499	499
Systems operation and maintenance	-	-	-	-	-	-	933	933
Employee benefits	-	-	-	-	-	-	984	984
Totals	$666	$601	$842	$1,747	$1,133	$1,689	$5,662	$12,340

Table J-1: Direct fire-fighting expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Firefighters' wages	$ 934	$ 507	$ 794	$1,169	$103	$ 524	$ 107	$ 4,138
Overtime charges	692	880	629	315	157	377	94	3,144
Equipment rentals	836	566	820	1,005	230	270	21	3,748
Supplies	766	736	842	758	203	660	420	4,385
Claims re-imbursement	308	526	42	484	96	94	903	2,453
Air tanker flying	329	352	345	400	51	421	405	2,303
Fire support flying	1,219	554	1,307	1,110	103	1,132	579	6,004
Other expenses	32	266	63	57	45	65	125	653
Totals	$5,116	$4,387	$4,842	$5,298	$988	$3,543	$2,654	$26,828

Table K-1: Fire suppression preparedness expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Standby charges	$222	$ 283	$ 202	$ 101	$51	$121	$ 33	$ 1,013
Initial attack crews	184	157	338	201	187	317	951	2,335
Detection and surveillance	213	319	576	651	147	52	-	1,958
Weather and fire behavior	143	189	228	172	127	132	670	1,661
Equipment purchases	29	67	56	132	27	30	4,100	4,441
Aircraft availability	-	-	-	-	-	-	9,294	9,294
Air tanker bases	117	143	110	149	132	80	1,235	1,966
Planning, research and systems	-	-	-	-	-	-	1,923	1,923
Employee benefits	-	-	-	-	-	-	400	400
Other expenses	65	106	98	56	169	170	787	1,451
Totals	$973	$1,264	$1,608	$1,462	$840	$902	$19,393	$26,442

Table L-1: Forest Resource Development Agreement expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Backlog reforestation	$2,778	$2,912	$5,874	$10,805	$3,292	$ 919	$14,744	$41,324
Intensive forest management	2,458	2,193	2,429	3,194	2,804	6,336	562	19,976
Implementation and communication	269	396	644	643	330	501	1,427	4,210
Employee benefits	-	-	-	-	-	-	3	3
Totals	$5,505	$5,501	$8,947	$14,642	$6,426	$7,756	$16,736	$65,513

Table M-1: Forest Stand Management Fund expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Forest enhancement employment	$302	$111	$111	$130	$66	$1,012	-	$1,732
Administration	186	-	27	-	55	458	-	726
Westar project	-	-	-	118	-	-	-	118
Totals	$488	$111	$138	$248	$121	$1,470	-	$2,576

Table N-1: Small Business Forest Enterprise Program expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration[1]	$1,904	$2,126	$1,336	$2,331	$2,779	$ 5,283	$305	$16,064
Harvesting	1,975	4,553	2,602	4,501	6,082	7,498	-	27,211
Silviculture	230	548	313	1,048	554	124	-	2,817
Protection	64	156	67	14	100	26	-	427
Totals	$4,173	$7,383	$4,318	$7,894	$9,515	$12,931	$305	$46,519

Note:
1. Transferred from Harvesting Program.

Table O-1: South Moresby Implementation expenditures in 1988-89, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration	-	-	-	-	-	$ 48	-	$ 48
Intensive silviculture	-	-	-	-	$109	630	-	739
Research and demonstration	-	-	-	-	-	188	-	188
Totals	-	-	-	-	$109	$866	-	$975

Table Q-1: Silviculture expenditures in 1988-89, by activity and region

Funding Source	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
	'000							
Ministry Sources								
Vote[1]	$10,193	$15,657	$11,772	$28,603	$16,091	$15,937	$35,822	$134,075
FRDA[2]	5,505	5,501	8,947	14,642	6,426	7,756	11,595	60,372
SBFEP[3]	230	548	313	1,048	554	124	-	2,817
FSMF[4]	488	111	138	248	121	1,470	-	2,576
SMFRA[5]	-	-	-	-	109	678	-	787
Sub-totals	16,416	21,817	21,170	44,541	23,301	25,965	47,417	200,627
Other sources[6]	120	576	42	92	-	462	-	1,292
Totals[7]	$16,536	$22,393	$21,212	$44,633	$23,301	$26,427	$47,417	$201,919

Notes:
1. Ministry Vote (see Table E-1).
2. Canada-British Columbia Forest Resource Development Agreement (see Table L-1). Excludes research and protection expenditures.
3. Small Business Forest Enterprise Program (see Table N-1).
4. Forest Stand Management Fund (see Table M-1).
5. South Moresby Forest Replacement Account (see Table O-1). Excludes research and inventory expenditures.
6. Other includes federal job-creation programs ($909,000) and others, such as the provincial Corrections Program ($383,000) and represents the value of the accomplishments carried out by the programs.
7. Does not include expenditures by the private sector on silviculture activities.

V. Detailed Statistical Tables

Table D-2: Average stumpage prices[1] in 1988-89, by region and species[2]

Region	Balsam		Cedar		Cypress		Douglas-fir	
	Volume	Price	Volume	Price	Volume	Price	Volume	Price
	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)
Cariboo:								
Coast	-	-	-	-	-	-	-	-
Interior	407	5.65	79	2.03	-	-	534	6.67
Kamloops	596	6.02	344	4.40	*	4.25	1 125	7.43
Nelson	413	5.61	556	4.88	-	-	748	6.09
Prince George	1 709	9.01	37	3.32	-	-	277	10.71
Prince Rupert:								
Coast	293	3.25	130	3.79	16	1.61	-	-
Interior	1 672	4.82	106	4.55	*	3.61	*	4.86
Vancouver:								
Coast	2 657	8.03	3 662	9.77	531	12.17	1 720	6.14
Interior	254	3.19	58	2.18	5	1.91	159	3.76
Totals	8 001		4 972		552		4 563	
Weighted average		6.84		8.32		11.77		6.71

Region	Hemlock		Larch		Lodgepole Pine		Spruce	
	Volume	Price	Volume	Price	Volume	Price	Volume	Price
	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)
Cariboo:								
Coast	-	-	-	-	-	-	-	
Interior	25	2.15	-	-	4 233	2.57	1 805	5.73
Kamloops	232	2.73	68	5.43	2 677	3.87	1 579	7.08
Nelson	369	5.17	314	6.00	2 152	4.09	1 090	5.66
Prince George	13	4.04	*	1.11	4 192	7.38	5 801	9.09
Prince Rupert:								
Coast	581	3.22	-	-	5	1.43	119	5.67
Interior	2 171	1.68	-	-	2 060	8.35	1 387	7.28
Vancouver:								
Coast	6 226	8.78	-	-	6	4.25	571	11.70
Interior	142	2.39	-	-	29	7.31	95	4.62
Totals	9 759		382		15 354		12 447	
Weighted average		6.47		5.90		5.11		7.90

Region	White pine		Other species		All species	
	Volume	Price	Volume	Price	Volume	Price
	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)	(000 m^3)	($/$m^3$)
Cariboo:						
Coast	-	-	-	-	-	-
Interior	*	7.68	9	.56	7 092	3.85
Kamloops	49	7.34	14	7.56	6 684	5.46
Nelson	109	8.00	21	7.68	5 772	5.09
Prince George	*	4.63	183	.50	12 212	8.38
Prince Rupert:						
Coast	-	-	1	.46	1 145	3.51
Interior	-	-	24	.47	7 420	5.32
Vancouver:						
Coast	24	9.66	44	1.22	15 441	8.79
Interior	5	2.16	*	5.86	747	3.41
Totals	187		296		56 513	
Weighted average		7.88		1.45		6.68

Notes:

1. Based on gross stumpage received on timber billed from tree farm licences, forest licences and timber sale licences. Volume excludes firmwood rejects and waste. Excludes stumpage received from Small Business Forest Enterprise Program sales.
2. Since October 1987, most timber has been sold with a single stumpage rate for each stand. These average stumpage rates should be read in that context.

* Indicates volume less than 500 m^3.

Table D-3: Volume of all products billed[1] in 1988-89, by region and land status

Land Status	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
	'000[3]							
Crown land								
Tree farm licence[2]	90	803	1 430	554	1 559	8 315	12 751	
Forest licence	6 766	5 754	4 184	11 304	6 727	7 768	42 503	
Timber sale licence (major)	138	49	187	318	114	144	950	
Timber sale licence (minor)	1 457	1 537	1 077	2 161	1 918	1 610	9 760	
Licence to cut	507	181	27	602	187	98	1 602	
Timber licence								
Within tree farm licence	-	-	-	-	33	3 577	3 610	
Outside tree farm licence	-	180	104	54	61	3 001	3 400	
Woodlot licence	83	70	43	128	38	51	413	
Other[3]	63	10	24	245	18	272	632	
Sub-Totals	9 104	8 584	7 076	15 366	10 655	24 836	75 621	
Private land[4]								
Within tree farm licence	-	-	9	-	-	444	453	
Within woodlot licence	-	-	-	-	-	-	-	
Outside tree farm licence and woodlot licence	548	947	1 277	1 301	716	4 020	8 809	
Sub-Totals	548	947	1 286	1 301	716	4 464	9 262	
Federal land and Indian reserves	3	51	6	56	64	126	306	
Totals	9 655	9 582	8 368	16 723	11 435	29 426	85 189	

Notes:
1. Includes firmwood rejects.
2. Includes schedule B lands only.
3. Includes rights-of-way, beachcomb, trespass and miscellanea.
4. All Crown-granted lands.

Table D-4: Volume of all products billed[1,2] in 1988-89, by region and species

Region	Balsam	Cedar	Cypress	Douglas-fir	Hemlock	Larch	Lodgepole pine	Spruce	White pine	Other	Totals
	'000 m^3										
COAST											
Cariboo	-	-	-	-	-	-	-	-	-	-	-
Prince Rupert	357	206	21	*	734	-	9	169	-	13	1 509
Vancouver	4 601	6 583	899	4 498	10 687	-	17	926	52	334	28 597
Sub-totals	4 958	6 789	920	4 498	11 421	-	26	1 095	52	347	30 106
INTERIOR											
Cariboo	457	84	-	1 063	25	-	5 689	2 278	*	60	9 656
Kamloops	762	550	*	1 957	436	111	3 543	1 989	90	143	9 581
Nelson	523	899	-	1 314	629	549	2 833	1 375	141	105	8 368
Prince George	2 140	78	-	401	19	*	5 896	7 598	1	591	16 724
Prince Rupert	2 101	174	*	*	2 552	*	2 938	2 086	-	74	9 925
Vancouver	285	67	5	165	171	-	31	97	5	3	829
Sub-totals	6 268	1 852	5	4 900	3 832	660	20 930	15 423	237	976	55 083
Totals	11 226	8 641	925	9 398	15 253	660	20 956	16 518	289	1 323	85 189

Notes:
1. Includes firmwood rejects.
2. Includes all harvesting on Crown, private and federal lands and Indian reserves.
* Indicates volume less than 500 cubic metres.

Table D-5: Area harvested in 1988-89, by region

Region	Harvesting method	Crown land				Private land				
		TFL[1]	TSA[2]	Other[3]	Sub-total	TFL[4]	TSA	Other[5]	Sub-total	Totals
		hectares								
Cariboo	Clear-cut	285	46 256	1 577	48 118	-	-	1 271	1 271	49 389
	Selective cut	-	5 778	40	5 818	-	-	40	40	5 858
	Sub-totals	285	52 034	1 617	53 936	-	-	1 311	1 311	55 247
Kamloops	Clear-cut	2 714	25 649	203	28 566	-	1 883	47	1 930	30 496
	Selective cut	110	4 795	339	5 244	-	1 905	70	1 975	7 219
	Sub-totals	2 824	30 444	542	33 810	-	3 788	117	3 905	37 715
Nelson	Clear-cut	4 496	16 391	135	21 022	84	4 465	60	4 610	25 632
	Selective cut	220	4 768	438	5 426	-	2 767	178	2 945	8 371
	Sub-totals	4 716	21 159	573	26 448	85	7 232	238	7 555	34 003
Prince George	Clear-cut	3 757	51 716	2 214	57 687	-	-	8 031	8 031	65 718
	Selective cut	-	17	-	17	-	-	-	-	17
	Sub-totals	3 757	51 733	2 214	57 704	-	-	8 031	8 031	65 735
Prince Rupert	Clear-cut	3 748	26 645	264	30 657	-	-	2 681	2 681	33 338
	Selective cut	-	65	20	85	-	-	15	15	100
	Sub-totals	3 748	26 710	284	30 742	-	-	2 696	2 696	33 438
Vancouver	Clear-cut	14 093	17 283	1 674	33 050	2 955	6 298	-	9 253	42 303
	Selective cut	-	1 746	20	1 766	-	194	-	194	1 960
	Sub-totals	14 093	19 029	1 694	34 816	2 955	6 492	-	9 447	44 263
Sub-total	Clear-cut	29 093	183 940	6 067	219 100	3 040	12 646	12 090	27 776	246 876
	Selective cut	330	17 169	857	18 356	-	4 866	303	5 169	23 525
Totals		29 423	201 109	6 924	237 456	3 040	17 512	12 393	32 945	270 401

Notes:
1. Includes Crown land within tree farm licences.
2. Includes Crown land within timber supply areas, excluding tree farm licences.
3. Includes Crown land within woodlot licences, farm leases, federal lands and Indian reserves.
4. Includes private land within tree farm licences.
5. Includes private land outside tree farm licences.

Table D-6: Volume of logs exported from B.C. in 1988-89, by species

Species	Exported under permit[1]	Other exports[2]	Totals
	'000 m^3		
Balsam	518	94	612
Cedar	*	*	*
Cypress	5	34	39
Douglas-fir	235	158	393
Hemlock	667	156	823
Lodgepole pine	60	*	60
Spruce	423	10	433
Other softwood	5	1	6
Cottonwood	64	25	89
Other hardwood	58	16	74
Totals	2 035	494	2 529

Notes:

1. Export permit granted under Section 137 of the Forest Act. Logs harvested from provincial Crown land, private land within a tree farm licence area, and from private land granted by the Crown after March 12, 1906.
2. No export permit required under the Forest Act. Logs harvested from private land that was granted by the Crown prior to March 13, 1906, and is not within a tree farm licence area, and logs harvested from federal land and Indian reserves.

* Indicates volume less than 500 cubic metres.

Table D-7: Number of licences as at March 31, 1989, by region

Form of rights to timber	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Total
	number						
Regular licences							
Tree farm licence[1]	1	5	5	3	3	14	31
Woodlot licence	91	76	46	159	49	29	450
Forest licence	15	25	31	27	19	57	174
Timber sale licence (pulpwood agreement)	-	-	-	4	-	-	4
Timber sale licence (major)	12	41	32	25	16	50	176
Timber sale licence (minor) SBFEP[2]	127	190	196	199	337	321	1,370
Other[3]	36	66	130	60	53	160	505
Sub-totals	282	403	440	477	477	631	2,710
Temporary licences							
Forest licence [4,5]	10	-	-	9	4	9	32
Timber sale licence SBFEP[6]	5	2	-	4	3	3	17
Sub-totals	15	2	-	13	7	12	49
Totals	297	405	440	490	484	643	2,759

Notes:
1. Tree Farm Licence 25 is in both the Vancouver and Prince Rupert forest regions.
2. Small Business Forest Enterprise Program (SBFEP): actual number of licences as at March 31, 1989.
3. Licences issued within the Forest Service reserve. This total includes forest licences in effect on March 31, 1989, and licences for salvage sales, cash sales, free-use permits, etc.
4. Special Forest Licence in Lot 7741 Military reserve.
5. Special forest licences, e.g., salvage sales.
6. Special timber sale licences.

Table D-8: Volume committed as at March 31, 1989, by region

Form of rights to cut timber	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	'000 m^3						
Regular licences							
Tree farm licence[1]	110	768	1 453	970	1 370	13 913	18 584
Woodlot licence	81	79	45	144	42	57	448
Forest licence[4]	7 009	5 714	3 605	12 605	5 949	7 648	42 530
Timber sale licence (pulpwood agreement)	-	-	-	1 624	-	-	1 624
Timber sale licence (major)	142	14	57	161	26	61	461
Timber sale licence SBFEP[3,5]	1 609	1 281	827	2 089	1 615	1 787	9 208
Forest Service reserve[2]	36	60	164	153	164	85	662
Totals	8 987	7 916	6 151	17 746	9 166	23 551	73 517

Notes:
1. Tree Farm Licence 25 is in both the Vancouver and Prince Rupert forest regions.
2. Volume apportioned to the Forest Service reserve.
3. Timber sale licence SBFEP, includes volume for timber sale licence major that is not more than 10 000 cubic metres. Volume is apportioned by allowable annual cut.
4. Includes non-replaceable forest licence.
5. Includes non-replaceable timber sale licences.

Table D-9: Road construction, inventory and construction costs in 1988-89, by region and road size

Region	Road size[1]	Construction: By licensee[2]	Construction: By ministry[3]	Current inventory[4]	Construction cost[5]
		kilometres			$'000
Cariboo	Double lane	-	33	665	$ 315
	Single lane	-	23	3 127	340
	Sub-totals	-	56	3 792	655
Kamloops	Double lane	8	-	149	-
	Single lane	6	149	8 158	2712
	Sub-totals	14	149	8 307	2712
Nelson	Double lane	-	-	258	-
	Single lane	-	125	7 866	1924
	Sub-totals	-	125	8 124	1924
Prince George	Double lane	75	-	2 307	-
	Single lane	73	90	3 953	2549
	Sub-totals	148	90	6 260	2549
Prince Rupert	Double lane	4	-	378	-
	Single lane	37	144	1 896	4311
	Sub-totals	41	144	2 274	4311
Vancouver	Double lane	-	-	22	-
	Single lane	27	47	3 723	3075
	Sub-totals	27	47	3 745	3075
Provincial Sub-totals	Double lane	87	33	3 779	315
	Single lane	143	578	28 723	14,911
Totals		230	611	32 502	$ 15,226

Notes:

1. Ministry of Forests road sizes:
   - Double lane, Class 1 (10 metres wide)
   - Class 2 (nine metres wide)
   - Class 3 (eight metres wide)
   - Single lane, Class 4 (six metres wide)
   - Class 5 (five metres wide)
   - Class 6 (four metres wide)
2. Main access roads constructed by licensee with the costs reflected in the calculation of stumpage.
3. Includes works approved under the Small Business Forest Enterprise Program and the Emergency Bark Beetle Program.
4. March 31, 1989. Includes transfers to and from other government agencies and private ownership, and cancellations.

Table D-10: Road improvement, upgrading and maintenance, with costs, in 1988-89, by region and road size

Region	Road size[1]	Improvements/ upgrading[2] By licensee[4]	Improvements/ upgrading[2] By ministry[5]	Maintenance[3] By ministry[5]	Improvements/ upgrading[6]	Maintenance[6]
		kilometres			$'000	
Cariboo	Double lane	-	121	16	$873	$3
	Single lane	-	160	262	750	190
	Sub-totals	-	281	278	1,623	193
Kamloops	Double lane	-	-	-	-	-
	Single lane	8	107	643	629	457
	Sub-totals	8	107	643	629	457
Nelson	Double lane	-	-	-	-	-
	Single lane	9	87	1 262	507	414
	Sub-totals	9	87	1 262	507	414
Prince George	Double lane	8	1	178	13	66
	Single lane	1	64	580	865	278
	Sub-totals	9	65	758	878	344
Prince Rupert	Double lane	-	7	20	420	19
	Single lane	47	52	136	544	258
	Sub-totals	47	59	156	964	277
Vancouver	Double lane	-	-	-	-	-
	Single lane	5	138	1 055	2,148	483
	Sub-totals	5	138	1 055	2,148	483
Provincial Sub-totals	Double lane	8	129	214	1,306	88
	Single lane	70	608	3 938	5,443	2,080
Totals		78	737	4 152	$ 6,749	$ 2,168

Notes:

1. Ministry of Forests road sizes:
   - Double lane, Class 1 (10 metres wide)
   - Class 2 (nine metres wide)
   - Class 3 (eight metres wide)
   - Single lane, Class 4 (six metres wide)
   - Class 5 (five metres wide)
   - Class 6 (four metres wide)
2. Improvement beyond general surface maintenance: all aspects of structural maintenance, including road 'reconstruction.'
3. Surface maintenance that includes culvert repairs and replacement of small culverts, cleaning of ditches, bank clearing, spot gravelling and surface grading.
4. Main access roads improvements by the licensee and costs reflected in the calculation of stumpage.
5. Includes works approved under the Small Business Forest Enterprise Program and the Emergency Bark Beetle Program.
6. Licensees' costs are not included.

Table D-11: Bridge and major culvert construction, inventory and costs in 1988-89, by region and bridge class

Region	Stucture class[1]	Construction[2]			Cost	
		By licensee[3]	By ministry[4]	Current inventory[5]	Construction[6]	Inspection/ maintenance[6]
		number			$ '000	
Cariboo	P	1	4	47	$ 184	$ 27
	SP	-	3	25	49	-
	T	-	-	91	-	-
	MC	-	-	29	-	-
	Sub-totals	1	7	192	233	27
Kamloops	P	2	10	75	263	10
	SP	-	7	47	180	1
	T	5	2	390	7	7
	MC	-	-	23	-	2
	Sub-totals	7	19	535	450	20
Nelson	P	1	3	66	138	2
	SP	2	17	94	277	31
	T	3	13	619	189	21
	MC	-	2	111	7	2
	Sub-totals	6	35	890	611	56
Prince George	P	3	4	158	857	32
	SP	-	5	67	205	2
	T	4	2	123	44	3
	MC	7	2	177	18	7
	Sub-totals	14	13	525	1,124	44
Prince Rupert	P	22	13	74	1,648	20
	SP	-	-	11	-	3
	T	-	5	97	58	14
	MC	4	1	29	31	-
	Sub-totals	26	19	211	1,737	37
Vancouver	P	2	7	69	775	2
	SP	8	4	103	90	-
	T	2	18	457	433	114
	MC	-	-	51	-	29
	Sub-totals	12	29	680	1,298	145
Provincial Sub-totals	P	31	41	489	3,865	93
	SP	10	36	347	801	37
	T	14	40	1 777	731	159
	MC	11	5	420	56	40
Totals		66	122	3 033	$ 5,453	$ 329

Notes:

1. Ministry of Forests' structure classes:
   - P: Permanent: Any bridge having all of its major components constructed of steel, concrete, or timber that has been pressure-treated with a suitable preservative.
   - SP: Semi-Permanent: Any bridge having a substantial proportion of its components constructed of steel, concrete, or timber that has been pressure-treated with a suitable preservative.
   - T: Temporary: Any bridge having most of its components constructed of untreated wood.
   - MC: Major Culverts: A minimum diameter of 1 800 mm.
2. Includes replacement structures.
3. As approved under 'main access' policy, with cost reflected in the calculation of stumpage.
4. Includes works approved under the Small Business Forest Enterprise Program and the Emergency Bark Beetle Program.
5. March 31, 1989. Includes transfers to and from other government agencies and private ownership, deletions and closures.

Table E-2: Basic silviculture accomplishments on Crown land funded by the ministry[3], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	51 491	67 740	42 160	60 908	75 865	56 128	354 292
Preparing sites	10 013	15 582	9 656	22 755	9 743	3 022	70 771
Planting	9 844	17 464	10 662	43 710	22 582	14 767	119 029
Brushing	503	1 092	596	4 323	2 522	10 091	19 127
Spacing[1]	97	-	113	-	79	352	641
Other[2]	1 741	193	304	1 433		149	3 820
Totals	73 689	102 071	63 491	133 129	110 791	84 509	567 680
	'000						
Seedlings planted	17,742	22,758	14,458	52,772	24,504	12,936	145,170

Notes:

1. Includes spacing of young conifers and the falling of diseased and damaged trees.
2. Includes pruning, controlling of mistletoe, and falling snags and residual trees.
3. Includes all silviculture accomplishments funded through the ministry vote for basic silviculture. Includes silviculture activities on areas denuded under the Small Business Forest Enterprise Program and by licensees between 1982 and October 1, 1987. Silviculture activities are carried out under the supervision of the ministry and licensees.

Table G-2: Number and causes of wildfires in 1988-89, by region

Cause	Cariboo		Kamloops		Nelson		Prince George		Prince Rupert		Vancouver		Totals	
	1988-1989	10-year average	1988-1989	10-year average	1988-1989	10-year average	1988-1989	10-year average	1988-1989	10-year average	1988-1989	10-year average	1988-1989	10-year average
	number of wildfires													
Lightning	67	134	121	338	197	344	43	271	1	66	93	106	552	1,259
Recreation[1]	14	19	61	56	30	32	46	31	30	26	41	48	222	212
Railroads	3	4	22	29	10	13	5	8	-	2	6	12	46	68
Smokers	21	31	43	64	31	39	22	20	6	17	38	49	161	220
Brush burning[2]	30	23	38	28	15	13	40	36	12	19	18	19	153	138
Range burning	38	30	9	7	4	1	3	11	-	1	-	-	54	50
Construction[3]	3	3	7	2	-	3	3	4	-	3	2	4	15	19
Industrial[4]	62	29	65	48	45	37	76	43	26	25	64	51	338	233
Incendiary	59	84	29	30	15	10	20	33	7	12	4	8	134	177
Miscellaneous														
known causes	80	58	88	85	50	43	16	21	21	35	27	30	282	272
unknown causes	3	1	6	2	4	2	4	2	1	1	6	2	24	10
Totals	380	416	489	689	401	537	278	480	104	207	299	329	1,951	2,658

Notes:
1. Campers, hunters, fishermen, etc.
2. Excluding railway or right-of-way clearing.
3. Road, power, phone, pipeline, and right-of-way construction.
4. Timber harvesting, mining and other industries.

Table G-3: Area burned by wildfires in 1988-89, by region

Region	Merchantable timber[1]		Immature timber[1]		Other cover[1]		Totals[2]	
	1988-1989	10-year average	1988-1989	10-year average	1988-1989	10-year average	1988-1989	10-year average
	hectares							
Cariboo	670	1 471	393	569	924	938	2 144	3 439
Kamloops	257	1 134	41	508	603	1 006	1 080	3 009
Nelson	366	4 047	162	1 698	603	1 707	1 247	7 393
Prince George	706	17 714	1 686	9 786	3 126	26 163	5 668	53 854
Prince Rupert	319	17 226	38	8 831	232	5 316	613	31 438
Vancouver	156	1 110	209	440	288	626	730	2 275
Totals	2 474	42 702	2 529	21 832	5 776	35 756	11 482	101 408

Note:
1. Includes wildfires on not-satisfactorily-restocked forest land, non-commercial forest land, grazing land, and non-productive sites. Only for wildfires greater than four hectares in area.
2. Includes also those wildfires less than four hectares in area.

Table G-4: Timber burned by wildfires[1] in 1988-89, by region

Region	Merchantable timber	Immature timber	Totals
	'000 m^3		
Cariboo	82.1	7.3	89.4
Kamloops	66.7	2.2	68.9
Nelson	130.8	8.5	139.3
Prince George	69.3	11.9	81.2
Prince Rupert	102.9	3.3	106.2
Vancouver	44.0	35.6	79.6
Totals	495.8	68.8	564.6

Notes:
1. RAP report by region before salvage. Burned timber is salvaged wherever practical.
2. Estimates. Based on species and generalized information on age and site. Assumes *complete mortality*.

Table G-5: Area under attack by forest pests[1] in 1988-89, by region

Region	Bark beetles[2]	Defoliators	Totals[3]
	hectares		
Cariboo	1 683	48 700	50 383
Kamloops	19 090	390 334	409 424
Nelson	25 800	6 073	31 873
Prince George	4 065	101 725	105 790
Prince Rupert	13 060	61 200	74 260
Vancouver	966	15 830	16 796
Totals	64 664	623 862	688 526

Notes:
1. Best available estimates of current annual losses as compiled by Forestry Canada except for the Cariboo forest region values. Accuracy varies, depending on pest.
2. Area of forests killed by bark beetles is estimated from aerial surveys in 1988. Represents trees killed in 1987.
3. Many more pests are endemic throughout most forests. Estimates of area under attack are meaningless for these pests without detailed measures of the intensity of infestation.

Table G-6: Timber damaged by forest pests[1] in 1988-89, by region

Region	Bark beetles[2]	Defoliators	Dwarf mistletoes[3]	Root diseases	Totals[4]
	'000 m^3				
Cariboo	30	208	350	221	809
Kamloops	1 785	1 678	260	224	3 947
Nelson	467	26	98	58	649
Prince George	72	437	262	529	1 300
Prince Rupert	768	66	315	73	1 222
Vancouver	15	69	355	262	701
Totals	3 137	2 484	1 640	1 367	8 628

Notes:
1. Best available estimates of current annual losses. Accuracy varies, depending on the pest. Only the major forest pests of B.C. are included. Volumes are estimated before salvage. Attacked timber is salvaged wherever practical.
2. Bark beetle volumes are compiled by Forestry Canada, except for Cariboo forest region values.
3. Estimates for losses occurring on the net land base for dwarf mistletoes and root diseases.
4. Volume lost to decay in forests exceeding 100 years of age is not included. This is estimated at 10 million cubic metres per year. Nursery and regeneration losses, losses due to other insects, diseases and unwanted vegetation are also not included.

Table H-2: Grazing permits and grazing licences in 1988-89, by region

Region	Permits			Licences		
	Number	Authorized	Used	Number	Authorized	Used
		AUM[1]			AUM	
Cariboo	520	255,869	233,015	130	103,458	89,805
Kamloops	365	183,349	174,294	141	172,615	167,960
Nelson	230	75,377	68,841	24	8,958	8,208
Prince George	400	88,362	79,630	77	52,840	49,450
Prince Rupert	166	19,984	15,779	36	12,888	11,679
Vancouver	25	4,234	1,811	3	646	600
Totals	1,706	627,175	573,370	411	351,405	327,702

Note:
1. AUM or Animal Unit Month is the amount of forage required for one month by an average beef cow, aged six months or older.

Table H-3: Hay cutting permits and hay cutting licences in 1988-89, by region

Region	Permits			Licences		
	Number	Authorized	Used	Number	Authorized	Used
		tonnes			tonnes	
Cariboo	43	581	464	83	1 697	1 373
Kamloops	-	-	-	3	106	106
Nelson	-	-	-	2	35	-
Prince George	11	194	166	6	93	18
Prince Rupert	3	26	14	7	147	137
Vancouver	1	8	8	-	-	-
Totals	58	809	652	101	2 078	1 634

Table H-4: Range improvements[1] on Crown land in 1988-89, by region

Region	Seeding: Grassland rehabilitation	Seeding: Disturbed forest land[2]	Fencing[3]	Weed control[4]	Water development[5]	Other[6]
	hectares		(kilometres)	hectares	numbers	
Cariboo	-	1 768	38	7	145	32
Kamloops	-	3 566	62	492	45	66
Nelson	40	1 646	18	143	21	12
Prince George	336	2 005	32	59	38	15
Prince Rupert	3	900	17	10	-	11
Vancouver	-	-	-	-	-	-
Totals	379	9 885	167	711	249	136

Notes:
1. Excludes improvements funded by the Federal Initiative Program and wholly by private sources.
2. Includes seeding of clearcuts.
3. Includes repair, maintenance and construction of fences.
4. Control of knapweed, thistle, etc.
5. Includes repair, maintenance and development of water sources.
6. Includes repair, maintenance and development of trails, corrals, cattleguards, etc.

Table H-5: Average cost[1] of range improvements[2] on Crown land in 1988-89, by region

Region	Seeding[3]: Total activity	Seeding[3]: By ministry	Fencing[4]: Total activity	Fencing[4]: By ministry	Weed control[5]: Total activity	Weed control[5]: By ministry
	$/ha		$/km		$/ha	
Cariboo	$70	$70	$2,400	$851	$3,540	$3,540
Kamloops	20	16	2,039	605	262	262
Nelson	35	30	1,617	641	386	386
Prince George	66	29	1,755	1,101	450	450
Prince Rupert	18	13	2,488	909	20	20
Vancouver	-	-	-	-	-	-

Notes:
1. Based on funds from the Range Management Program, other ministry programs and other sources (on cost-sharing projects).
2. Excludes improvements funded by FEP and exclusively by other non-ministry sources.
3. Combines grassland rehabilitation and seeding of disturbed forest land, mainly clearcuts.
4. Construction of new fences.
5. Includes containment of knapweed, thistle and other weeds.

Table H-6: Recreation site and trail use in 1988-89, by region

Region	Sites		Trails		
	Number	User visits[1]	Number	Length (kilometres)	User visits[2]
Cariboo	141	240,129	25	416	13,800
Kamloops	358	392,978	119	2 284	145,101
Nelson	235	123,965	38	332	67,118
Prince George	231	161,319	54	1 294	56,136
Prince Rupert	77	68,623	36	347	19,423
Vancouver	192	423,089	86	409	130,110
Totals	1,234	1,410,103	358	5 082	431,688

Notes:
1. Estimates. Based on field surveys.
2. Estimates.

Table L-2: Canada-B.C. Forest Resource Development Agreement accomplishments[1] in 1988-89, by region

Program	Sub-Program	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert[2]	Vancouver	Totals
		hectares						
Program 1 Backlog reforestation	Surveying	36 056	46 046	54 762	79 821	29 491	15 593	261 769
	Rehabilitating sites	3 397	1 799	3 323	14 822	3 655	505	27 501
	Planting	3 354	4 768	9 777	14 184	4 470	832	37 385
	Sub-totals	42 807	52 613	67 862	108 827	37 616	16 930	326 655
		'000						
	Seedlings planted	4 348	5 678	9 268	16 601	4 396	768	41 059
		hectares						
Program 2 Intensive forest management	Brushing	196	1 427	514	4 468	2 131	2 555	10 991
	Freeing older conifers from competition	283	251	201	599	314	340	1 988
	Spacing[3]	3 590	2 045	1 974	2 683	1 259	5 251	16 802
	Fertilizing	1 560	-	1 597	2 175	2 250	3 876	11 458
	Other[4]	87	37	825	492	424	-	1 865
	Sub-totals	5 716	3 760	5 111	10 417	6 378	11 722	43 104
Totals		48 523	56 373	72 973	119 244	43 994	28 652	369 759

Notes:

1. Includes all silviculture accomplishments funded through the Canada-B.C. Forest Resource Development Agreement. Includes silviculture activities on areas denuded before 1982, under the Small Business Forest Enterprise Program and by licensees. Silviculture activities are carried out under the supervision of the ministry and licensees.
2. Does not include North Coast forest district accomplishments. No history record report available.
3. Includes spacing of young conifers and the falling of diseased and damaged trees.
4. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table M-2: Incremental silviculture accomplishments on Crown land funded by the Forest Stand Management Fund[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	-	142	-	-	-	505	647
Brushing	4	-	2	62	-	465	533
Freeing older conifers from competition	11	-	-	-	-	65	76
Spacing[2]	405	64	-	-	-	117	586
Fertilizing	-	-	-	-	-	3	3
Rehabilitating sites	-	-	-	-	-	37	37
Other[3]	-	-	-	-	-	474	474
Totals	420	206	2	62	-	1 666	2 356

Notes:
1. Includes all silviculture accomplishments funded through the Forest Stand Management Fund. Includes work carried out under the Forestry Enhancement Program. Silviculture activities are carried out under the supervision of the ministry and licensees.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table N-2: Stumpage billed[1] from the Small Business Forest Enterprise Program in 1988-89, by region

Regions	Volume billed[2]	Stumpage appraised	Bonus bid[3]	Stumpage billed	Stumpage billed as a per cent of stumpage appraised
	'000 m3	'000			per cent
Cariboo	1 342	$ 5,688	$ 5,621	$ 11,309	199
Kamloops	1 436	6,411	8,806	15,217	237
Nelson	1 093	5,444	3,091	8,535	157
Prince George	2 071	21,824	13,023	34,847	160
Prince Rupert	1 711	8,170	8,648	16,818	206
Vancouver	1 617	11,143	19,150	30,293	272
Totals	9 270	$ 58,680	$ 58,339	$ 117,019	Weighted average 199

Notes:
1. Stumpage billed during 1988-89 does not include accruals.
2. Excludes firmwood rejects and waste.
3. Bid for timber, in addition to stumpage appraised.

Table N-3: Small Business Forest Enterprise Program in 1988-89, by region

Region	Registrants[1]		Sales		Volume	
	Cat. 1[2]	Cat. 2[3]	Cat. 1	Cat. 2	Sold[4]	Value[5]
	number				'000 m^3	$ '000
Cariboo	263	39	161	39	1 249	$ 17,504
Kamloops	362	74	284	63	1 434	19,997
Nelson	212	66	106	36	907	9,796
Prince George	298	46	161	21	2 943	55,393
Prince Rupert	307	69	204	56	1 933	31,065
Vancouver	630	71	206	15	2 086	51,482
Totals	2072	365	1122	230	10 552	$185,237

Notes:
1. On March 31, 1989.
2. Category 1: Registrants who do not own or lease a timber processing facility.
3. Category 2: Registrants who own or lease a timber processing facility.
4. Tendered volume.
5. Value based upon appraised price at time of sale plus bonus bid, if any.

Table N-4: Audit Report on Small Business Forest Enterprise Program's basic silviculture performance on Crown land in 1988-89, by region

Region	Number of licences	Total area audited	Basic silviculture in progress		Area declared free-growing			Penalties	
			Free-growing likely	Not free-growing likely	Accepted	Per Cent of Target	Not Accepted	Financial	Allowable annual cut
		hectares				%	ha	$	m^3
Cariboo	5	468	468	-	-	-	-	-	-
Kamloops	6	158	158	-	-	-	-	-	-
Nelson	57	2031	2 031	-	-	-	-	-	-
Prince George	8	330	330	-	-	-	-	-	-
Prince Rupert	13	748	689	59	-	-	-	-	-
Vancouver	11	162	162	-	-	-	-	-	-
Province	100	3897	3 838	59	-	-	-	-	-

Table N-5: Basic silviculture accomplishments on Crown land funded by the Small Business Forest Enterprise Program[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	2 306	854	2 146	7 501	12 725	2 693	28 225
Preparing sites	853	1 104	686	2 972	1 191	147	6 953
Planting	-	116	19	-	31	437	603
Brushing	-	-	-	-	-	37	37
Spacing[2]	-	-	102	-	-	-	102
Other[3]	502	-	132	-	-	10	644
Totals	3 661	2 074	3 085	10 473	13 947	3 324	36 564
	'000						
Seedlings planted	-	167	27	-	37	330	561

Notes:
1. Includes all silviculture accomplishments funded through the Small Business Forest Enterprise Account. Includes silviculture activities on areas denuded under the Small Business Forest Enterprise Program after January 1, 1988. Silviculture activities are carried out under the supervision of the ministry.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table P-2: Basic silviculture accomplishments on Crown land funded by the private sector[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	1 613	1 864	1 312	19 712	7 872	4 465	36 838
Preparing sites	10 861	13 951	5 732	19 092	8 604	1 535	59 775
Planting	125	276	185	2 167	1 692	3 547	7 992
Brushing	4 245	140	-	103	-	155	4 643
Spacing[2]	22	-	235	-	-	-	257
Other[3]	79	-	26	-	-	46	151
Totals	16 945	16 231	7 490	41 074	18 168	9 748	109 656
	'000						
Seedlings planted	142	363	233	2 315	2 157	2 966	8 176

Notes:
1. Includes reported silviculture activities on areas denuded by licensees after October 1, 1987, and on royalty-bearing lands. Silviculture activities are carried out under the supervision of major licensees.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table P-3: Audit Report on basic silviculture performance on Crown land in 1988-89, by region and licensee

	Number of licences	Total area audited	Basic silviculture in progress		Area declared free-growing		Penalties		
			Free-growing likely	Not free-growing likely	Accepted		Not Accepted	Financial	Allowable annual cut
		hectares			— % — of target		— ha —	— $ —	— m^3 —
Cariboo[1]	---	------	------	-	-	-	-	-	-
Kamloops									
• Ainsworth Lumber Co. Ltd.	1	332	332	-	-	-	-	-	-
• Federated Coperatives Ltd.	2	538	538	-	-	-	-	-	-
• Slocan Forest Products Ltd.	1	511	511	-	-	-	-	-	-
• Tolko Industries Ltd.	1	454	454	-	-	-	-	-	-
• Westar Timber Ltd.	1	292	292	-	-	-	-	-	-
• Woodlot Licences	1	194	194	-	-	-	-	-	-
Sub-totals	7	2 321	2 321	-	-	-	-	-	-
Nelson									
• Crestbrook Forest Industries Ltd.	11	404	404	-	-	-	-	-	-
• Silver Ridge Sawmills (1968) Ltd.	1	25	25	-	-	-	-	-	-
• Slocan Forest Products Ltd.	4	201	201	-	-	-	-	-	-
• Evans Products Company Ltd.	4	105	105	-	-	-	-	-	-
• Westar Timber Ltd.	8	431	431	-	-	-	-	-	-
• Downie Treet Sawmills Ltd.	4	151	151	-	-	-	-	-	-
• Arrow Lakes Cedar Pole Co. Ltd.	1	51	51	-	-	-	-	-	-
• Atco Lumber Ltd.	2	68	68	-	-	-	-	-	-
• Bell Pole Co. Ltd.	2	35	35	-	-	-	-	-	-
• Pope and Talbot Ltd.	5	1 018	1 018	-	-	-	-	-	-
• Weyerhaeuser Canada Ltd.	2	362	362	-	-	-	-	-	-
• Columbia River Shake and Shingle Ltd.	1	27	27	-	-	-	-	-	-
• Meadow Creek Cedar Ltd.	1	34	34	-	-	-	-	-	-

	Number of licences	Total area audited	Basic silviculture in progress		Area declared free-growing			Penalties	
			Free-growing likely	Not free-growing likely	Accepted		Not Accepted	Financial	Allowable annual cut
		hectares				% of target	ha	$	m^3
Nelson (continued)									
• Remco Cedar Products Ltd.	1	60	60	-	-	-	-	-	-
• Wynndell Box and Lumber Co. Ltd.	1	13	13	-	-	-	-	-	-
• Ymir Forest Products Ltd.	1	127	127	-	-	-	-	-	-
• Joe Kozek Sawmills Ltd. or W & S Koz	1	30	30	-	-	-	-	-	-
Sub-totals	50	3 142	3 142	-	-	-	-	-	-
Prince George				-	-	-	-	-	-
• British Columbia Forest Products Ltd	3	209	209	-	-	-	-	-	-
• Findlay Forest Industries Ltd.	3	417	417	-	-	-	-	-	-
• Balfour Forest Products Inc.	1	138	138	-	-	-	-	-	-
• Canadian Forest Products Ltd.	1	169	169	-	-	-	-	-	-
• Lakeland Mills Ltd.	1	151	151	-	-	-	-	-	-
• L and M Lumber Ltd.	1	76	-	76	-	-	-	-	-
• Northwood Pulp and Timber Ltd.	1	75	75	-	-	-	-	-	-
• Rustad Bros. and Co. Ltd.	1	101	101	-	-	-	-	-	-
Sub-totals	12	1 336	1 260	76	-	-	-	-	-
Prince Rupert					-	-	-	-	-
• Boyle and Dean Logging Ltd.	2	52	52	-	-	-	-	-	-
• Wedeene River Cont. Ltd.	2	16	16	-	-	-	-	-	-
• Buffalo Head Forest Products Ltd.	1	51	51	-	-	-	-	-	-
• Skeena Cellulose Inc.	1	93	93	-	-	-	-	-	-
• Tay-M Logging	1	93	93	-	-	-	-	-	-
• Bell Pole Co. Ltd.	1	36	36	-	-	-	-	-	-
• Skeena Sawmills Ltd.	1	54	54	-	-	-	-	-	-
• Orenda Forest Products Ltd.	1	86	86	-	-	-	-	-	-
• Hobenshield Bros. Logging Ltd.[3]	1	n/a	-	-	-	-	-	-	-

	Number of licences	Total area audited	Basic silviculture in progress		Area declared free-growing			Penalties	
			Free-growing likely	Not free-growing likely	Accepted		Not Accepted	Financial	Allowable annual cut
		hectares			% of target		ha	$	m^3
Prince Rupert (continued)									
• Westar Timber Ltd.[3]	1	n/a	-	-	-	-	-	-	-
• Pacific Insland Resources Ltd.	5	245	245	-	-	-	-	-	-
• D. Groot Logging Ltd.	4	242	242	-	-	-	-	-	-
• Northwood Pulp and Timber Ltd.	3	125	116	9	-	-	-	-	-
• Houston Forest Products Ltd.	3	77	77	-	-	-	-	-	-
• Babine Forest Products Ltd.	1	51	51	-	-	-	-	-	-
Sub-totals	28	1 221	1 212	9	-	-	-	-	-
Vancouver									
• Weldwood of Canada Ltd.	3	186	186	-	-	-	-	-	-
• Terminal Forest Products Ltd.	1	47	47	-	-	-	-	-	-
• Western Forest Products Ltd.	1	29	29	-	-	-	-	-	-
• Fletcher Challenge Canada Ltd.	1	28	28	-	-	-	-	-	-
• Richmond Plywood Corp. Ltd.	1	112	112	-	-	-	-	-	-
• Doman Industries Ltd.	1	133	133	-	-	-	-	-	-
• Canadian Pacific Forest Products Ltd.	1	151	151	-	-	-	-	-	-
Sub-totals	9	686	686	-	-	-	-	-	-
Totals	106	8 706	8 621	85	-	-	-	-	-

Notes:
1. Cariboo forest region did not conduct any licensee audits.
2. Office audit only, no hectares recorded.

Table Q-2: Total silviculture accomplishments on Crown land funded by all sources[3] in 1988-89, by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	91 466	116 696	100 844	168 057	125 953	79 576	682 592
Preparing sites	21 875	30 814	16 074	44 823	19 538	4 794	137 918
Planting	13 327	22 628	20 694	60 071	28 775	19 876	165 371
Brushing	4 948	2 675	1 112	8 956	4 653	13 166	35 510
Freeing older conifers from competition	294	251	201	623	314	405	2 088
Spacing[1]	4 213	2 969	2 424	2 843	1 338	6 980	20 767
Fertilizing	1 560	-	1 597	2 175	2 250	3 879	11 461
Rehabilitating sites	3 397	1 799	3 323	14 822	3 655	542	27 538
Other[2]	2 638	258	1 287	1 925	424	784	7 316
Totals	143 718	178 090	147 556	304 295	186 900	130 002	1 090 561
	'000						
Seedlings planted	22,238	28,972	24,057	71,707	31,094	17,256	195,324

Notes:
1. Includes the spacing of young trees and the falling of diseased and damaged trees.
2. Includes pruning, controlling mistletoe, and falling snags and residual trees.
3. Includes silvilculture accomplishments through all funding sources:
   - Ministry Vote
   - Other sources
   - Canada-British Columbia Forest Resource Development Agreement
   - Forest Stand Management Fund
   - Small Business Forest Enterprise Account
   - Private sector

Table Q-3: Site preparation for planting and natural restocking on Crown land in 1988-89, by region[1]

Treatment	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Broadcast burned	10 844	7 334	7 979	14 886	10 341	3 539	54 923
Spot burned	2 461	6 809	825	6095	2 963	439	19 592
Broadcast mechanical	6 654	9 880	5 940	20 180	4 888	207	47 749
Spot mechanical	16	188	36	751	756	163	1 910
Broadcast chemical	-	584	10	920	429	363	2 306
Spot chemical	-	3 209	640	996	32	5	4 882
Other treatments[2]	1 900	2 810	644	995	129	78	6 556
Totals	21 875	30 814	16 074	44 823	19 538	4 794	137 918

Notes:
1. Includes accomplishments under all sources of funding.
2. Includes mistletoe control, cabling and knockdown of trees over three metres high.

Table Q-4: Area planted in 1988-89, by region and responsibility

	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Crown land							
• Tree farm licence[1]	-	2 111	3 135	4 817	5 054	6 669	21 786
• Timber supply area[2]							
• Licensee[3]	8 987	14 047	5 225	37 547	13 918	9 976	89 700
• Ministry[4]	4 340	6 470	12 334	17 707	9 803	3 231	53 885
Sub-totals	13 327	22 628	20 694	60 071	28 775	19 876	165 371
Private land							
• Tree farm licence[5]	-	-	-	-	-	1 088	1 088
• Managed forest land units[6]	-	-	-	-	3 013	3 013	
• Other[7]	-	-	-	-	-	13	13
Sub-total	-	-	-	-	-	4 114	4 114
Totals	13 327	22 628	20 694	60 071	28 775	23 990	169 485

Notes:

1. Includes Crown land within tree farm licences. On areas harvested after October 1, 1987, planting is paid for by the licensee. On areas denuded before October 1, 1987, planting is funded by the ministry. Planting is the licensee's responsibility.
2. Includes Crown land within timber supply areas, excluding tree farm licences, woodlot licences, farm leases, federal lands and Indian reserves.
3. Includes Crown land within timber supply areas. On areas harvested after October 1, 1987, planting is paid for by the licensee. On areas denuded before October 1, 1987, planting is funded by the ministry. Planting is the licensee's responsibility.
4. For areas denuded after January 1, 1988, under the Small Business Forest Enterprise Program, planting is funded through the Small Business Forest Enterprise Account. For areas denuded before January 1, 1988, planting is funded by the ministry and the Canada-B.C. Forest Resource Development Agreement. Planting is the ministry's responsibility.
5. Includes private land within tree farm licences.
6. Includes private land within managed forest land units, but outside tree farm licences.
7. Includes private land outside tree farm licences and managed forest land units.

Table Q-5: Trees planted in 1988-89, by region and responsibility

	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	'000s						
Crown land							
• Tree farm licence[1]	-	2,786	4,246	5,913	4,012	5,918	22,876
• Timber supply area[2]							
• Licensee[3]	16,208	18,208	6,992	44,385	16,003	8,401	110,197
• Ministry[4]	6,030	7,978	12,818	21,409	11,079	2,937	62,251
Sub-totals	22,238	28,972	24,056	71,707	31,094	17,256	195,324
Private land							
• Tree farm licence[5]	-	-	-	-	-	874	874
• Managed forest land units[6] -	-	-	-	-	2,505	2,505	
• Other[7]	-	-	-	-	-	9	9
Sub-total	-	-	-	-	-	3,388	3,388
Totals	22,238	28,972	24,056	71,707	31,094	20,644	198,712

Notes:

1. Includes Crown land within tree farm licences. On areas harvested after October 1, 1987, planting is paid for by the licensee. On areas denuded before October 1, 1987, planting is funded by the ministry. Planting is the licensee's responsibility.
2. Includes Crown land within timber supply areas, excluding tree farm licences, woodlot licences, farm leases, federal lands and Indian reserves.
3. Includes Crown land within timber supply areas. On areas harvested after October 1, 1987, planting is paid for by the licensee. On areas denuded before October 1, 1987, planting is funded by the ministry. Planting is the licensee's responsibility.
4. For areas denuded after January 1, 1988, under the Small Business Forest Enterprise Program, planting is funded through the Small Business Forest Enterprise Account. For areas denuded before January 1, 1988, planting is funded by the ministry and the Canada-B.C. Forest Resource Development Agreement. Planting is the ministry's responsibility.
5. Includes private land within tree farm licences.
6. Includes private land within managed forest land units, but outside tree farm licences.
7. Includes private land outside tree farm licences and managed forest land units.

Table Q-6: Trees planted[1] on Crown land in 1988-89, by region and species

Species	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	000s						
Cypress	-	-	-	-	-	41	41
Douglas-fir	3,998	5,269	5,531	1,654	98	5,736	22,286
Fir, alpine	-	-	-	-	10	62	72
Fir, amabilis	-	-	-	-	239	2,643	2,882
Fir, grand	-	-	-	-	-	214	214
Hemlock, mountain	-	-	-	-	20	48	68
Hemlock, western	-	-	-	-	1,384	1,558	2,942
Larch, western	-	63	912	-	-	-	975
Pine, lodgepole	9,741	8,705	5,514	20,042	17,633	27	61,661
Pine, western white	-	10	279	-	-	23	312
Pine, yellow	-	123	31	-	-	48	202
Redcedar, western	-	237	343	-	514	4,441	5,535
Spruce, Engelmann and white	8,499	14,565	11,447	50,011	6,025	960	91,507
Spruce, Sitka	-	-	-	-	5,171	1,454	6,625
Totals	22,238	28,972	24,057	71,707	31,094	17,256	195,324

Note:
1. Includes trees for both basic and intensive planting.
Includes trees planted through all funding sources (Table Q-2).

Table Q-7: Brushing[1] on Crown land in 1988-89, by region

Treatment	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Manual	4 253	1 489	998	2 485	1 276	2 772	13 273
Chemical	695	1 186	114	6 471	3 377	10 394	22 237
Totals	4 948	2 675	1 112	8 956	4 653	13 166	35 510

Note:
1. Includes accomplishments under all funding sources (Table Q-2)

Table Q-8: Average cost[1] of silviculture treatments on Crown land in 1988-89 by region

Treatment	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	B.C.
	$/hectares						
Basic silviculture							
• Surveying[2]	$ 7	$ 7	$ 8	$ 10	$ 8	$ 12	$ 9
• Preparing sites	251	191	326	265	194	400	244
• Planting[3]	406	420	482	370	341	434	405
• Brushing: manual	736	511	433	584	364	451	539
• Brushing: chemical[4]	274	378	417	217	391	399	338
Intensive silviculture							
• Surveying[2]	10	10	10	12	11	14	11
• Backlog planting[4]	385	379	446	372	363	393	403
• Spacing[5]	434	603	787	449	691	792	635
• Fertilizing	203	-	187	203	179	166	185
• Rehabilitating sites	287	393	367	270	238	295	289
• Freeing older conifers from competition	531	495	646	451	387	566	521
• Other	163	424	512	17	436	-	393

Notes:
1. Based on operating costs (equipment, transportation and wages for crew and crew boss).
2. Includes surveys for assessing site treatment, plantation survival and stocking.
3. Excludes cost of seedlings.
4. Includes cost of herbicides.
5. Includes the spacing of young trees and the falling of diseased and damaged trees.

Table Q-9: Seed additions, withdrawals and inventory in 1988-89, by species[1]

Species	Additions		Withdrawals			Final inventory[4]
	Natural collections	Seed orchard collections	Ministry nurseries[2]	Private and licensee nurseries[2]	Other[3]	
	kilograms					
Cypress	5.2	29.2	-	8.6	0.1	72.2
Douglas-fir	2 059.2	561.0	171.2	599.2	14.0	12 118.6
Fir, subalpine	5.0	-	68.0	26.3	3.1	746.6
Fir, amabilis	1 043.1	-	289.6	310.6	7.7	4 388.4
Fir, grand	195.8	-	12.1	35.3	-	948.4
Hemlock, mountain	0.3	-	0.4	0.1	0.1	142.4
Hemlock, western	77.3	7.5	14.1	31.5	0.2	71.0
Larch, western	33.5	-	14.7	5.1	0.3	314.4
Pine, lodgepole	881.9	9.5	346.9	499.9	3.2	5 026.9
Pine, ponderosa	294.7	-	71.3	30.3	1.6	767.7
Pine, white	483.6	-	15.5	32.6	-	435.5
Spruce, Engelmann	607.2	-	100.7	175.1	0.1	6 613.6
Spruce, Sitka	13.7	39.2	11.5	5.2	0.5	724.8
Spruce, white	19.3	-	222.8	427.7	1.7	4 213.1
Spruce, hybrids[5]	1 180.3	0.7	32.5	105.9	2.5	8 253.1
Redcedar, western	37.9	-	15.8	42.0	2.9	483.7
Miscellanea	-	-	0.1	0.6	2.0	182.7
Totals	6 938.0	647.1	1 387.2	2 336.0	40.0	45 503.1

Notes:
1. Excludes approximately 100 kilograms from exotic species.
2. For sowing of seedlings primarily in 1989-90.
3. For direct seeding, export, etc.
4. Anticipated final inventory upon completion of the 1989 spring sowing.
5. Includes natural crosses between Sitka, Engelmann, white and black spruce.

Table Q-10: Silviculture accomplishments on Crown land funded by the other sources[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	-	50	464	115	-	192	821
Preparing sites	148	177	-	4	-	90	419
Planting	4	4	51	10	-	293	362
Brushing	-	16	-	-	-	163	179
Freeing older conifers from competition	-	-	-	24	-	-	24
Spacing[2]	99	860	-	160	-	1260	2379
Other[3]	229	28	-	-	-	105	362
Totals	480	1 135	515	313	-	2 103	4 546
	'000						
Seedlings planted	6	6	71	19	-	256	358

Notes:
1. Includes funding under the federal job-creation programs, provincial Corrections Program, and the South Moresby Replacement Account. Silviculture activities are carried out under the supervision of the ministry and licensees.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

The Ministry's Structure

The ministry is structured to:

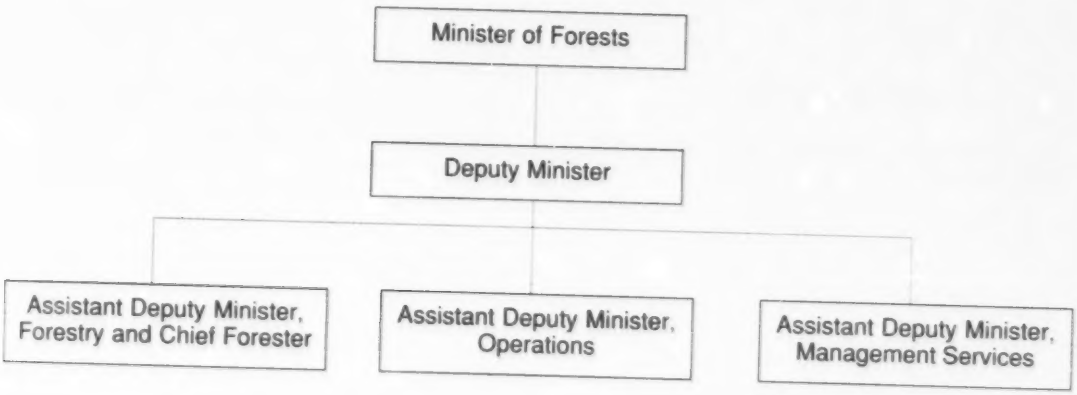
- Achieve excellence;
- Manage the forest resources more effectively;
- Ensure efficient and highly responsive service to ministry clients through decentralized decision-making;
- Emphasize integrated resource management and forest product development and marketing;
- Establish clear line/staff relationships;
- Ensure accountability of managers; and,
- Optimize contracting of services and an audit approach to management.

Headquarters Operation

The headquarters staff has three divisions:
- Forestry;
- Operations; and
- Management Services.

As shown in the organization chart below, each division is headed by an assistant deputy minister. These three officials, together with the deputy minister as chairman, constitute the ministry's executive.

Three branches of the ministry, headed by directors, report directly to the deputy minister. They are:
- Industry Development and Marketing;
- Public Affairs; and,
- Valuation.

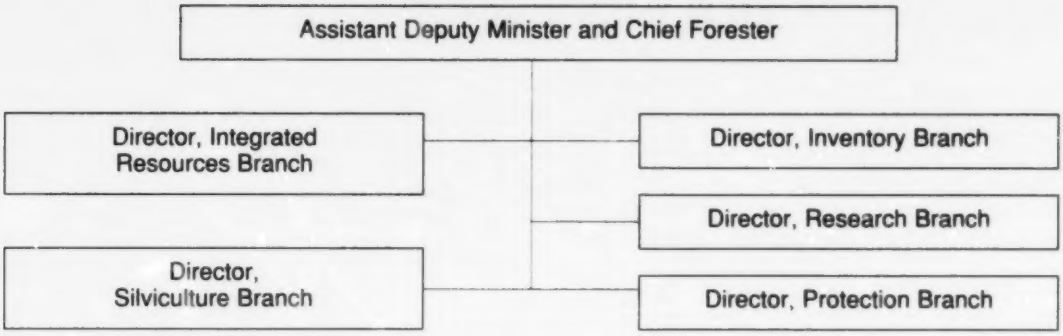

Minister of Forests
Deputy Minister
Assistant Deputy Minister, Forestry and Chief Forester
Assistant Deputy Minister, Operations
Assistant Deputy Minister, Management Services

Forestry Division

The Forestry Division ensures all Crown forest lands are managed to provide the greatest long-term benefits for British Columbians.
The assistant deputy minister of this division is also chief forester.
The Forestry Division is comprised of the following branches.

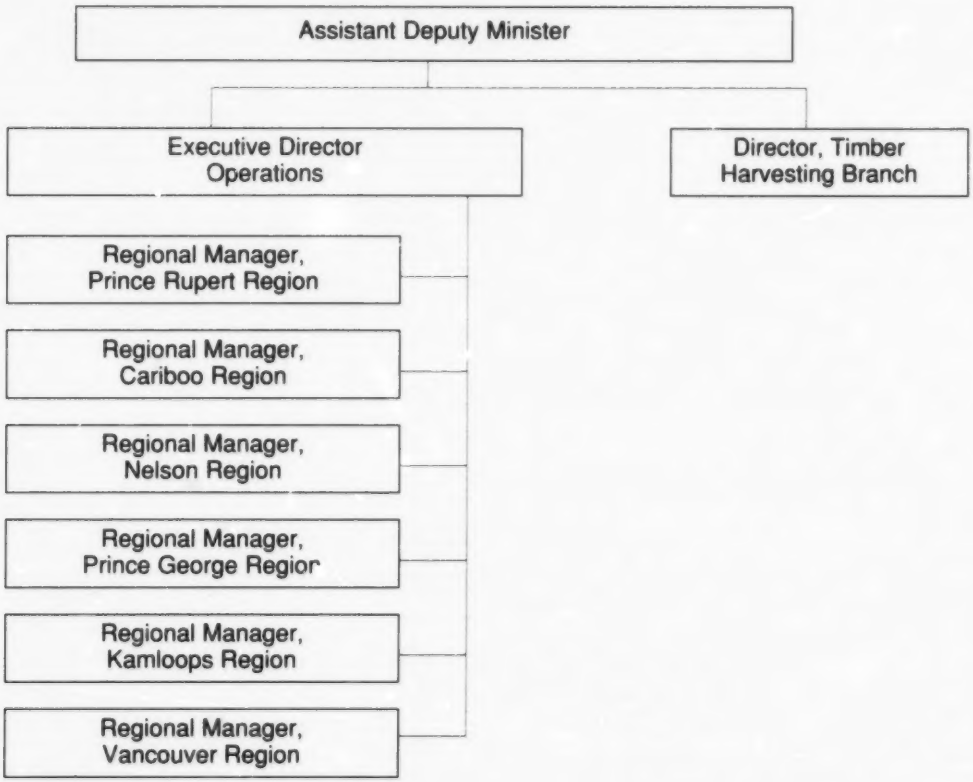
- Integrated Resources with three sections -- Resource Planning; Recreation; and, Range;
- Inventory;
- Research;
- Silviculture; and
- Protection.

Each branch is headed by a director. The director of the Integrated Resources Branch is also the Assistant Chief Forester.



Operations Division

The Operations Division oversees the forests regional and district offices. The Timber Harvesting Branch with two sections -- Timber Allocation and Engineering -- is also in this division.

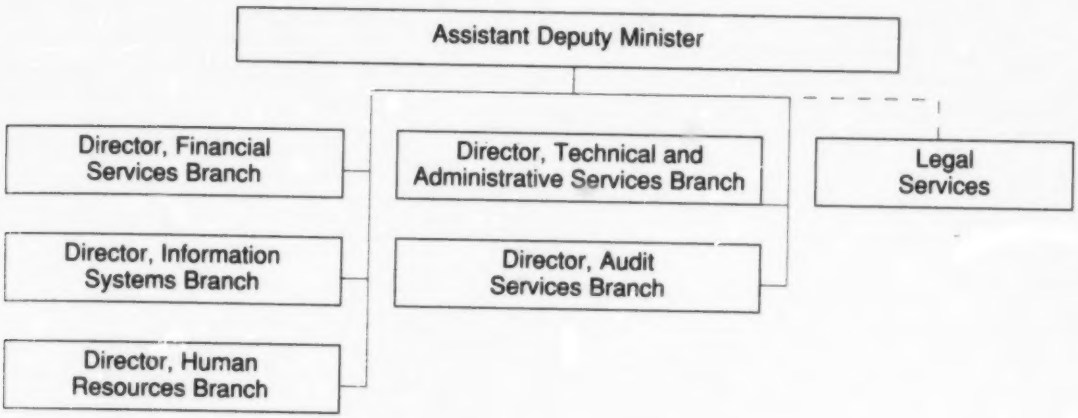

Assistant Deputy Minister
Executive Director Operations
Director, Timber Harvesting Branch
Regional Manager, Prince Rupert Region
Regional Manager, Cariboo Region
Regional Manager, Nelson Region
Regional Manager, Prince George Regior
Regional Manager, Kamloops Region
Regional Manager, Vancouver Region

Management Services Division

The Management Services Division is comprised of five branches, each headed by a director:

- Financial Services;
- Information Systems;
- Human Resources;
- Technical and Administrative Services; and,
- Audit Services.

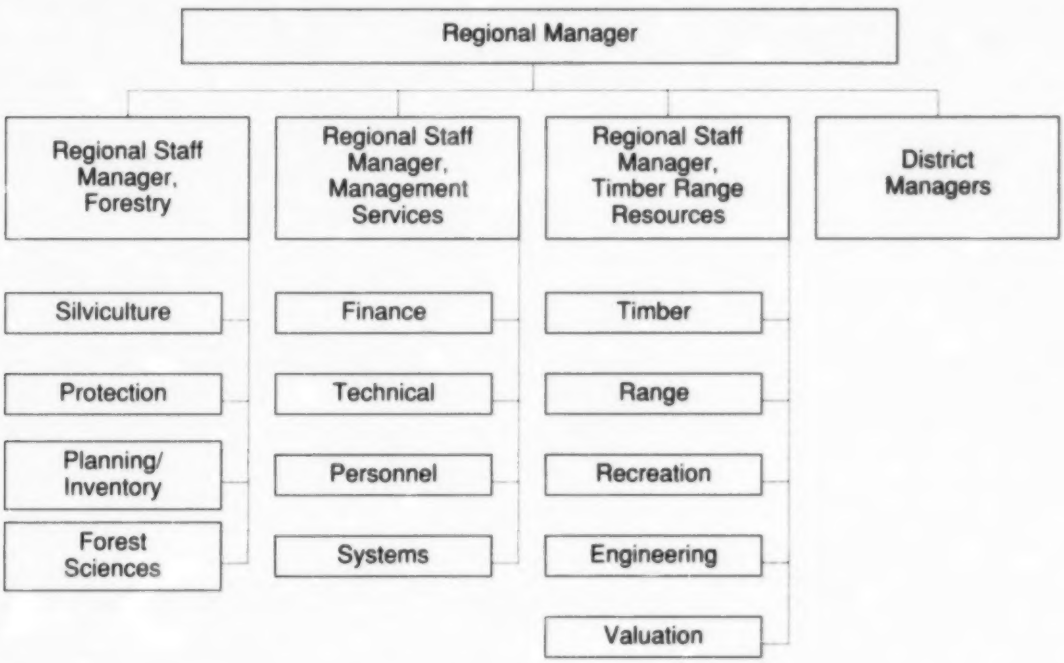
The division is also responsible for legal services.



Region Organization

The province is divided into six forest regions for administrative purposes with each forest region sub-divided into forest districts. Each region has a regional manager.
The organization of a forest regional office is shown below.
Three regional staff managers -- for forestry, management services, and timber range resources provide advice and services to each regional manager and to the various district managers who report to the regional manager.

Regional office personnel are responsible for servicing, co-ordinating and monitoring the activities of all field personnel operating out of district offices.
The staff of each regional office develops regional programs and plans, and ensures all policies, programs and procedures originating from ministry headquarters are administered consistently and effectively throughout the region.



District Organization

The province is divided into 43 forest districts, each administered from its own district office by a district manager. Some districts also administer field offices.
The organization of a forest district office is shown below.
Three district staff managers -- for harvesting, forestry and finance and administration -- provide advice and services to each forest district manager.